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AVIATION

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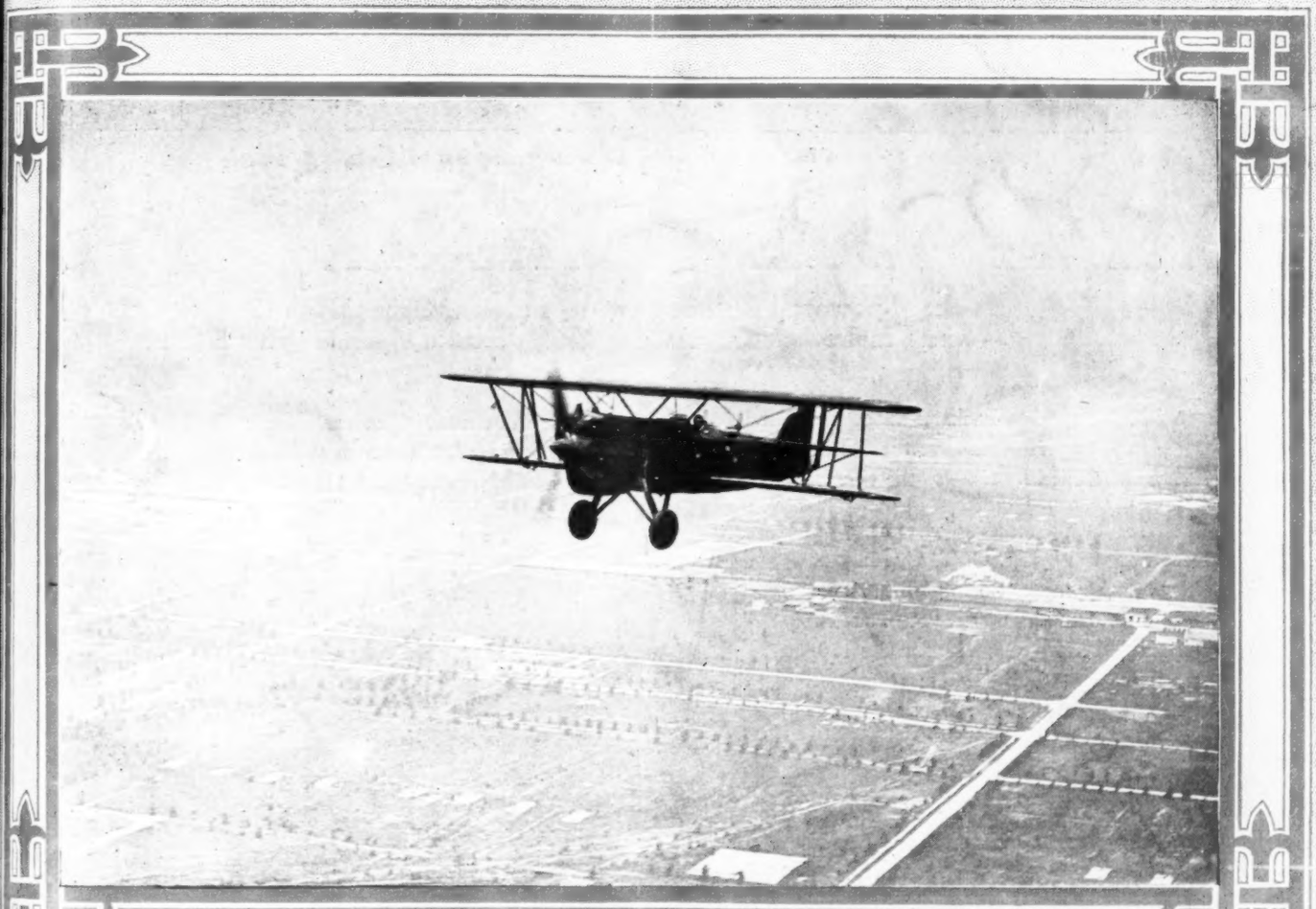
SEPTEMBER 27, 1926 Issued Weekly PRICE 15 CENTS



Cross-Country in a Curtiss O-1 Falcon Observation Plane (Liberty) of the Air Corps

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VOLUME XXI NUMBER 13

SPECIAL FEATURES

A FLYING TOUR OF EUROPE—LESTER D. GARDNER
POWER PLANT ASPECTS OF THE NATIONAL AIR RACES
THE PROPOSED AIR REGULATIONS

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK
Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y. under Act of March 3, 1879.

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Type of Huff-Daland bomber which took the first three places in the Liberty Bell Trophy Race for bombing planes.

PACKARD —*BOSS OF THE AIR*

Packard-powered planes win Pursuit Ship Race in Record Time —and make clean sweep—*first, second, third*—in Bomber Race

ONCE more has Packard added new laurels, and by its performance at the recent National Air Races, has earned its right to the title *Boss of the Air.*

The free-for-all military Pursuit Ship Race was won by Lt. G. T. Cuddihy of the Navy, flying a Boeing FB-3 plane, equipped with a 600 H.P. Packard Engine. The average time for this 120-mile race, over a 12-mile triangular course, was 180.495 miles per hour, a new world's record for standard pursuit ships.

Lt. Cuddihy's and Packard's victory was made more remarkable by the fact that he started tenth, in a field of twelve, and finished second.

In the Liberty Bell Trophy Race for light bombing planes, three Huff-Daland L. B. Bombers, equipped with 800 H.P. Packard Engines, took first, second and third places in a field of six. Lt. L. M. Wolfe of the Army was the winner, with an average speed of 123.71 miles per hour for the 120-mile course. Second and third places were taken by Lts. Kenneth Walker and J. M. Davies, at speeds of 119.689 and 118.667 miles per hour.

The terms of the race for the bombers carrying a useful load of more than one ton, with a crew of two men whose combined weight must be 340 pounds or more. The winner, loaded for the race, weighed more than four tons—a remarkable demonstration of the performance and power of the Packard Engine.

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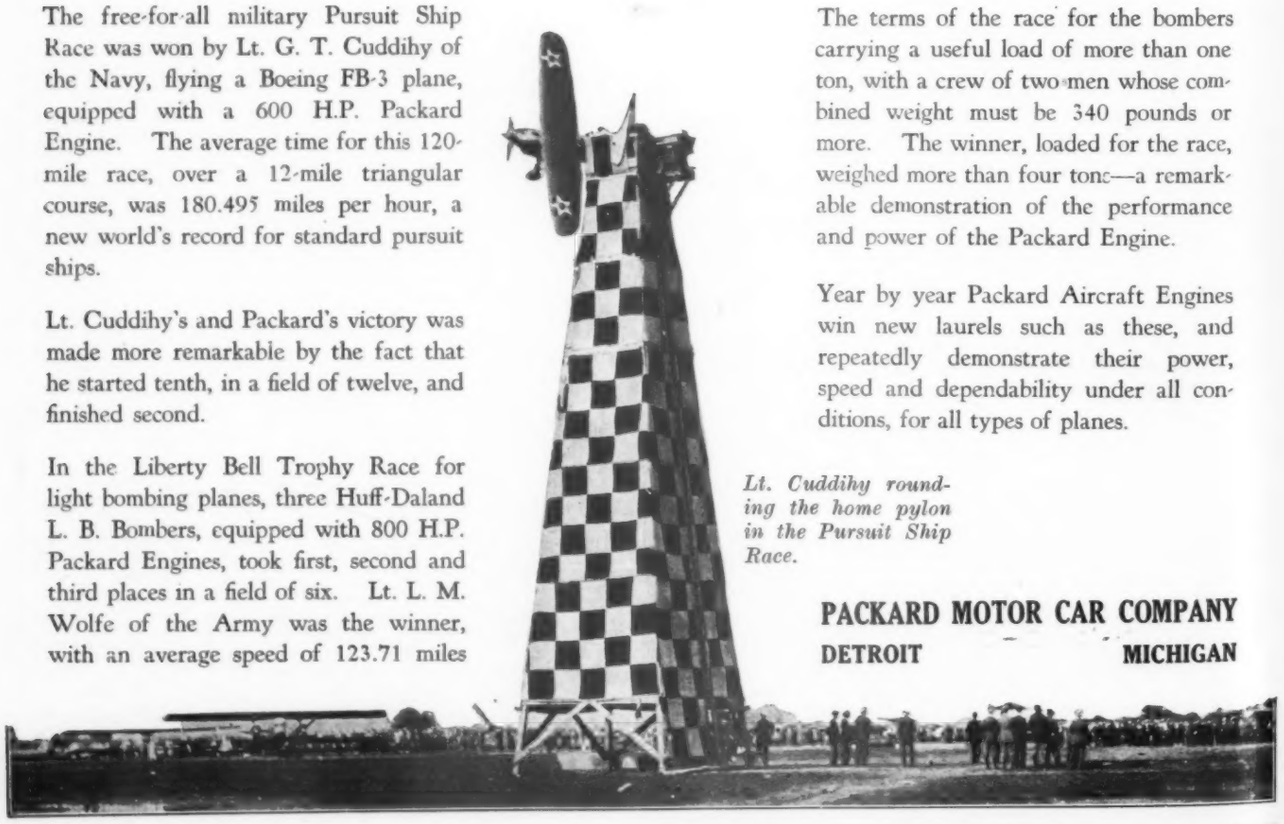

Lt. Cuddihy rounding the home pylon in the Pursuit Ship Race.

PACKARD MOTOR CAR COMPANY
DETROIT MICHIGAN

ASK THE MAN WHO OWNS ONE

SEPTEMBER 27, 1926 **AVIATION** VOL. XXI. NO. 13

Published every Monday

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GARDNER PUBLISHING COMPANY, Inc., *Publishers*

BUSINESS AND EDITORIAL OFFICES: 225 FOURTH AVENUE, NEW YORK
CABLE ADDRESS: AEROENG
Publication Office
HIGHLAND, N. Y.

Subscription price: Four dollars per year. Canada, five dollars. Foreign, six dollars. Single copies, fifteen cents. Back numbers 25 cents. Copyright 1926, by the Gardner Publishing Company.

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

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No more exacting service is required of the airplane than in dusting operations over the Southern cotton fields and orchards. The illustration shows one of the famous Petrol Dusting Planes produced by Huff Daland Aero Corp., powered with the Wright Whirlwind 200 hp. aircooled engine equipped with two SCINTILLA AIRCRAFT MAGNETOS.

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VOL. XXI SEPTEMBER 27, 1926 No. 13

Time to Settle Down

TWO OF the three great national air meets of the year are now relegated to history and the third and last will shortly take place at Norfolk, Va. Reference is, of course, made to the Schneider Cup International Seaplane race, and the Commercial Airplane Reliability Tour and National Air Races which have already been held. The time is drawing near, therefore, when the country's aeronautical activities will settle back into the routine of straightforward business flying.

These air meets do a tremendous amount of good. In the first place they provide, if nothing else, a means whereby aviation people throughout the country can get together. This fact, in itself, is one of the most important reasons for holding air meets. The value of aviation people getting together and discussing each other's problems cannot be overestimated. It is one of the most important factors in progress. Secondly, the competitive element at an air meet is a great stimulant of progress. While this does not apply quite in the same sense in the case of the Schneider Cup race, since, at least as far as America is concerned, it is usual for the planes of one manufacturer only to represent the nation, there is no doubt that in the Schneider Cup race has an important effect upon international aviation prestige.

In the two meets which have already been concluded, some very fine performances have been set up. The fact that eighteen of the twenty-five commercial airplanes which started in the Commercial Airplane Reliability Tour actually completed successfully the 2599 miles of scheduled cross-country flying is in itself a striking example of the development of the American commercial airplane. In the National Air Races approximately 164 entrants flew in races which covered about 1350 miles without a single serious accident. In addition, perhaps the most commendable individual performance was that of Fred Hoyt who won the On-to race with a flight from Eureka, Cal. in an OX-5 engined Travel Air in 31 hr. flying time. Furthermore, the record pursuit plane speed of 180.495 m.p.h. over a closed course set up by Lieutenant Cuddihy, U.S.N. flying a Boeing pursuit plane, was another performance indicative of progress and the excellence of American aircraft.

Each year the National Air Races appear to lose much of their attraction for the general public. As a consequence, the races are criticized on this basis and, no doubt, there are grounds for such comments. It is significant to note, however, that in many respects from the technical point of view, the races each year bring out signs of greater progress being made. This is highly commendable and should serve as some compensation. at least, to those men each year who's efforts and energies enable the staging of these annual events.

It is to be hoped and anticipated that the steady progress and unfoldment of the quiet period before next year's aviation "sporting" season will bring out equally excellent signs of steady progress.

Japan to Foster Commercial Aviation

THAT THE Japanese Government is about to launch an ambitious plan for the development of commercial aviation is among the most interesting pieces of aeronautical news at this time. The information takes on an event greater significance when cognisance is given to the attitude recently adopted by the Japanese representative at the Preliminary Disarmament Commission in Geneva when the question of the value of the commercial airplane in military service was brought up for consideration. While agreeing that there is a possible potential military value in the commercial airplane, it will be recalled that the report of the preliminary commission stipulated that commercial aviation should be permitted to develop freely, its military value being considered only in the event of further steps being taken towards aerial disarmament.

The new Japanese budget provides for the expenditure of 22,000,000 yen, which is approximately $11,000,000, on the development of commercial aviation over a period of seven years. The money is to be spent in providing air navigation facilities and in subsidizing a private company by a direct grant or on a mileage basis for air mail routes between Tokio and Osaka and Osaka and Dairen. It is of interest to note that the distance between Tokio and Osaka is approximately 220 miles and that between Osaka and Dairen, 850 miles. Moreover, the latter route involves the passage over a considerable stretch of water, the Korea Strait and a corner of the Yellow Sea. It is a very long and, it would seem, difficult route and no information is given as to the stops to be made or whether seaplanes or land machines are to be used.

The significance of the Japanese civil aviation proposals may be realized by a comparison, for example, with the British subsidies to civil aviation. The Air Ministry's 1926-1927 civil air estimates amounted to approximately $2,310,000 which, at this rate, would indicate an expenditure of over $14,000,000 for seven years, assuming no change in the estimate. Of this estimate for the present year, about $835,000 is for subsidy payments to the Imperial Airways European lines and the proposed Egypt to India line to start in January, 1927.

Thus, it will be seen that Japan is entering wholeheartedly into the development of commercial aviation, in the proposed two lines which are to be inaugurated. These will form a grand trunk air line across the islands which constitute Japan and will link the country with China and its colonial possessions on the Asiatic continent. Coming, as it does, as the first serious indication of commercial aviation development in Japan, the recent announcement can only be regarded as tremendously significant of the attitude adopted by Japan in aeronautical development problems.

A Flying Tour of Europe

By LESTER D. GARDNER

(THIRD PART)

IN THE two previous articles the air lines of Northern and Eastern Europe have been given a preliminary if sketchy outline. The trip, covering as it does a journey of approximately 21,000 miles would take too much space to cover in detail and in this third of the series the Southern European air routes will be given a short study.

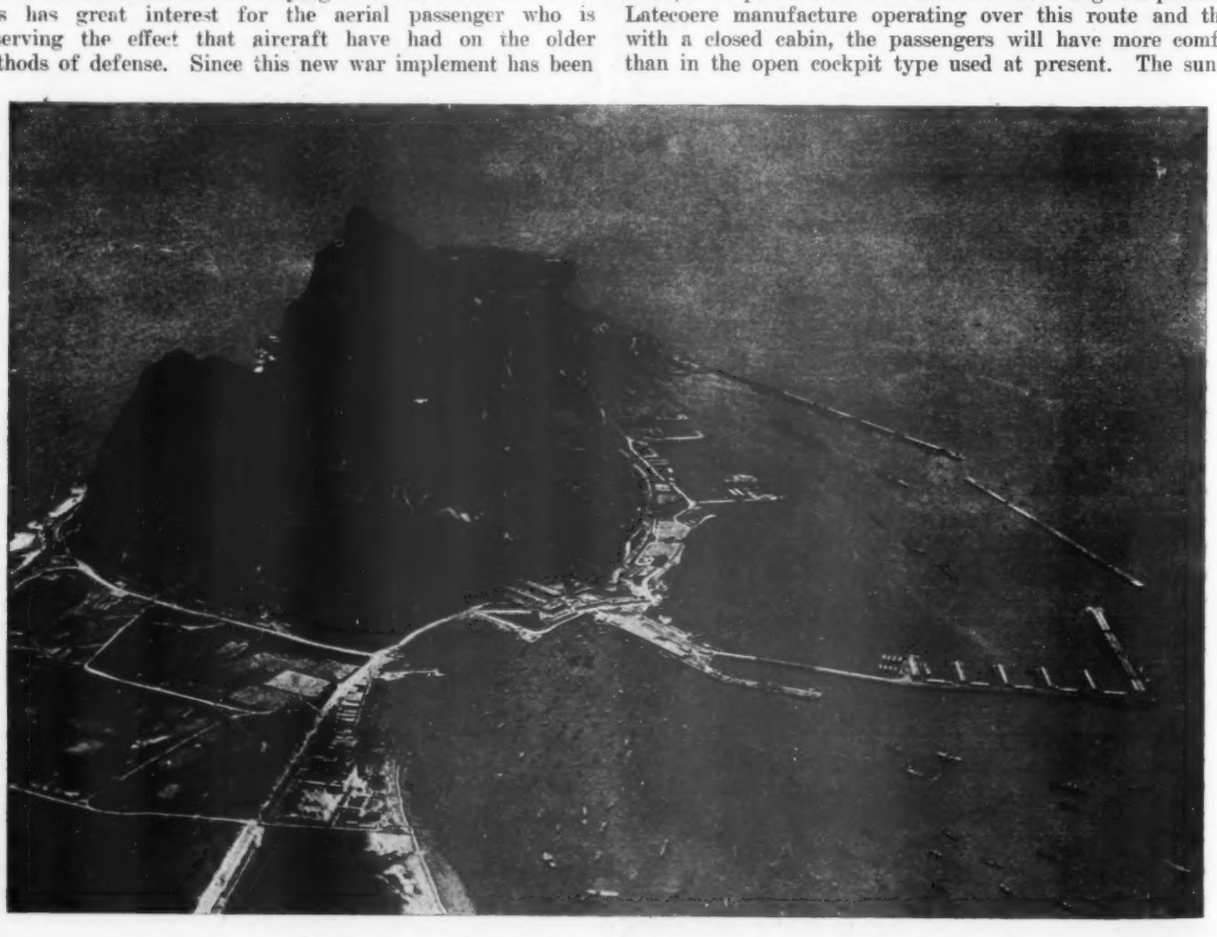
Over Gibraltar By Latecoere

Southwestern Europe has not had a great aerial development except as the Latecoere air line has made this part of the continent famous for the operation of one of the longest and most successful of all the air routes of the world. To give the history of this development would require more space than is available in this short summary but at the proper time a complete description will be given. Starting from Toulouse on the southermost border of France, this line flies southeast over the famous walled city of Carcassone to Perpignan, the most southerly city in France. It then crosses the border and passengers are given the great treat of a view of the Pyrenees, the picturesque mountain range of northern Spain. The flight is continued along the rugged coast of Spain passing over Barcelona, Tarragona and Valencia. At Alicante, the line divides into two parts, one going to Oran across the Mediterranean and the other to Africa by way of Grenada with the marvellous Alhambra and the Sierra Nevada snow capped peaks as the high spots of the flight, before Gibraltar is reached. Flying over this out of date fortress has great interest for the aerial passenger who is observing the effect that aircraft have had on the older methods of defense. Since this new war implement has been available the rock that has stood for centuries as the impregnable fortress that protected the gateway of the Mediterannean has become more of an historical monument than a strong, stragetic position.

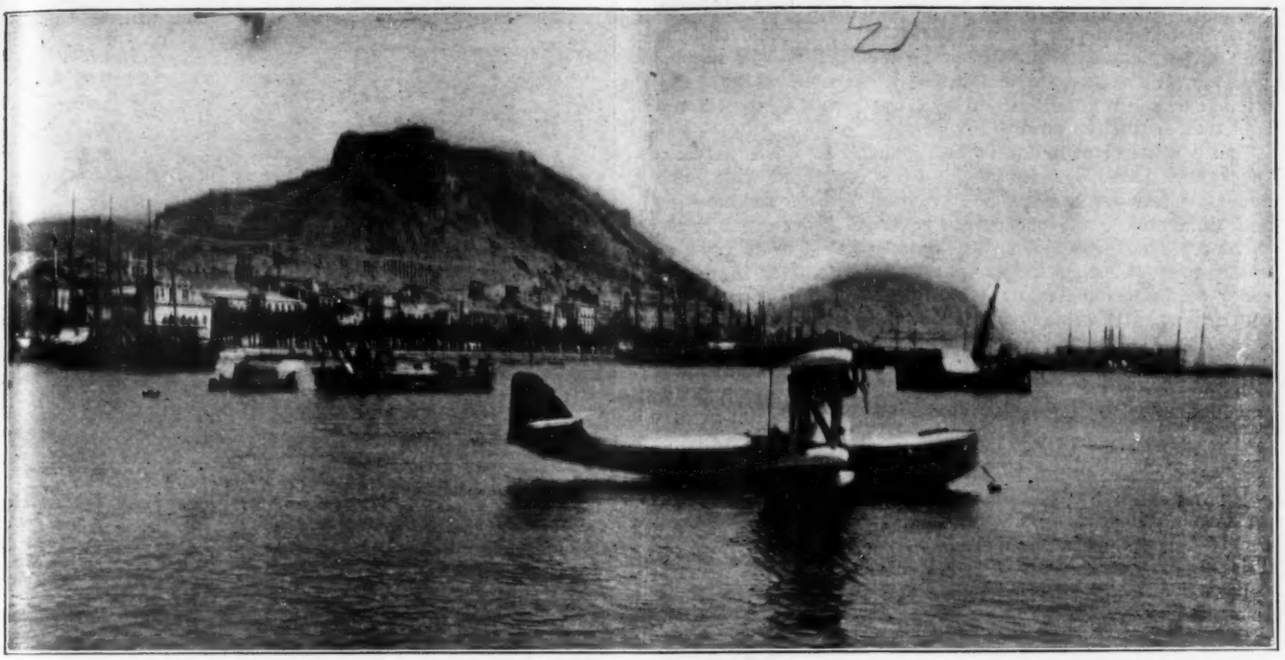
From Gibraltar the flight continues out through the Straits of Girbaltar. To the north, the southern coast of Spain can be seen extending for many miles eastward along the Mediterranean and when the Atlantic is reached the shoreline northward for fifty miles may be traced in the clear air of the southern sun. To the south, in Africa, the Low and High Atlas range of mountains may be seen with snow capped peaks in the distance. A turn to the south brings the Atlantic coast line of Africa into view and soon the first stop is made at Tangier, the internationalized city.

Arrival in Africa

With the landing in Africa, the first noticeable change is the native helpers in very picturesque clothes who service the airplanes under the direction of the Latecoere officials. The Breguet XIV, with its open cockpit carrying two passengers, has made a long air trip over very difficult flying country and the Renault engine has not missed once. The airport at Tangier is not planned for the accommodation of passengers but is merely a station on an air line that is more interested in the transportation of mail and goods than passengers, although its planes are usually filled on every trip. Soon, it is planned to have all-metal twin engined planes of Latecoere manufacture operating over this route and then, with a closed cabin, the passengers will have more comfort than in the open cockpit type used at present. The sun in



Gibraltar, as seen from the Latecoere plane on its way to Casablana



Latecoere Line seaplane (Liorre et Olivier) ready to leave Oran, Africa for Alicante, Spain

the summer becomes so hot that the pilots wear a hood of linen with holes cut for the mouth and eyes to protect their faces from the burn.

After a gassing, the journey is continued to Rabat on the Moroccoan coast. Here, for the first time the aerial tourist has a view of a typical Moroccoan city, the most striking feature of which is the pure white buildings. These cities along the coast have been built around a nucleus of old and closely built native houses, and the modern streets and European buildings give a strangely contrasting appearance to them. After a short stop at Rabat to leave the mail and goods, a short flight brings the day's air ride to an end, at Casablanca. Eleven hundred and fifty five miles have been covered since morning and the traveller is glad to get to a quiet hotel for a change. But the remarkable thing that was noted after this longest air trip in Europe was that after an opportunity had been given to walk a short distance, there was no sense of wearyness, only the natural fatigue of twelve hours in the open air.

Casablanca is the terminus of the Latecoere line from France but may also be considered as a way station as it also is the starting point for the continuation of the line for Dakar about 1800 miles farther south on the African coast. The planes from this city connect at Casablanca for the planes for Toulouse and Marseilles. Casablanca, itself, is a very modern French city and is a most delightful place to see a combination of Moroccoan life and French colonial development. While there the Sultan of Morocco left for France and it was a rare opportunity to see the native notables assembled for the first voyage outside his country of the ruler of this north African country.

The Site of the Riffian Fray

After a day's rest, the air tour was continued across the northern part of Africa to Oran on the Mediterannean. This flight of 472 miles gives the traveller a very comprehensive idea of this most interesting country as the route is over the cities of Fez, where a landing is made, Meknes and Oudja. The mountains of the Atlas range are crossed and much of the territory over which there has been much fighting with the Riffs can be seen. This country is not well suited for air fighting and it is clearly apparent why the air forces of France as well as the military had great difficulty in subduing the Riffians. The views from the air of the Moroccan cities with their characteristic palaces and mosques, all white, and surrounded with beautiful gardens again make one of the trips that the air tourist will, in the future, seek out as among the most interesting journeys than can be taken.

Arriving at Oran, the next flight is to be an oversea trip. But the traveller will, if he is wise, take a short trip by train to Algiers, the tourist center of Northern Africa. Last year, an air line connected Algiers with Alicante in Spain but it is not running at present. The trip across the Mediterannean by seaplane to Alicante is like all sea air rides, a monotonous experience especially in a closed cabin with small windows. Such trips are great time savers but unless a coast line is visible there is little of interest to see or record. The trip across is 188 miles and is made in slightly under three hours, whereas the boat takes twelve. At Alicante a change is made to a land plane and the Spanish flight described above is repeated in the reverse direction. Repeating an air trip has a great advantage for it gives an opportunity to see much of the country that was overlooked on the first flight. From the air there are so many views to be seen that no one trip will ever satisfy the air traveller who enjoys viewing beautiful scenery and interesting country.

One of the largest Fields in France

At Perpignan, instead of continuing to Toulouse, the alternate route to Marseilles was flown. This one hundred and seventy mile flight along the shore of southern France is most attractive as the whole distance is over a coast of great beauty dotted with interesting cities and fishing villages. Nearing Marseilles one of the largest flying fields in France is passed. It is the military training center of Istres with seven very large concrete hangars at the edge of a natural plain that looks miles across and as level as a table. At Marseilles, a joint field is maintained by the Latecoere line and the Air Union that has started a service this year to Paris.

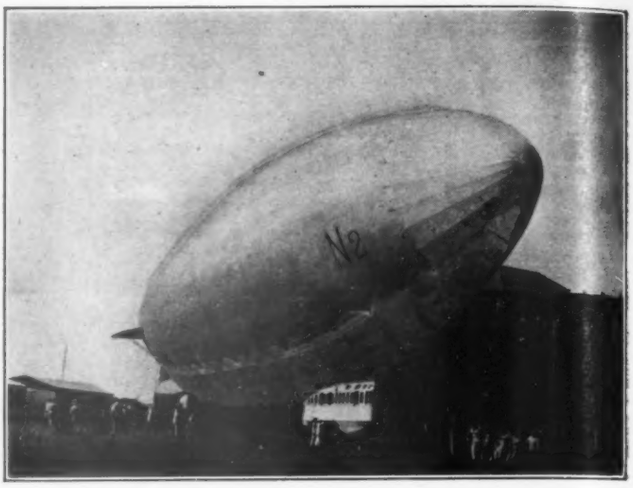
Before leaving the Latecoere trip which is of course one of the most interesting in the world, and before it can be treated in more complete manner as it is hoped will be possible at a later time, it should be noted that here is one of the most advantageous air routes in the world. It covers a very difficult route that takes a very long time to travel by any other kind of transportation and it renders a very real service not only to France but to the African colonial territories France is governing. It has made the transportation of mail and goods its main purpose and is generally conceded to be one of the lines that has a great opportunity for future

commercial development. It is planned to extend this service, when possible, to South America, either by boat or by a line of seaplanes. With these, the traffic that will become available will be so great that it may become one of the greatest and most profitable air lines of the world, if it does not hold that distinction now.

The new Air Union line from Marseilles to Paris, serves a very great need. The Riviera, now, is connected with Paris and travellers can leave the French capital in the morning and be at almost any one of the beautiful shore cities in the evening. The flight has a great interest, also, as it gives an opportunity of seeing Avignon, the French home of the Popes for a period, as well as the prosperous city of Lyons. Here connections may be made with the Balair air line that flies to Switzerland. The distance from Marseilles to Paris is 462 miles and it is flown by the Berline Spads in five hours and a half. With the other Air Union Lines to London, the travelling time from England to the Mediterranean is greatly shortened.

The Italian Coast from a Seaplane

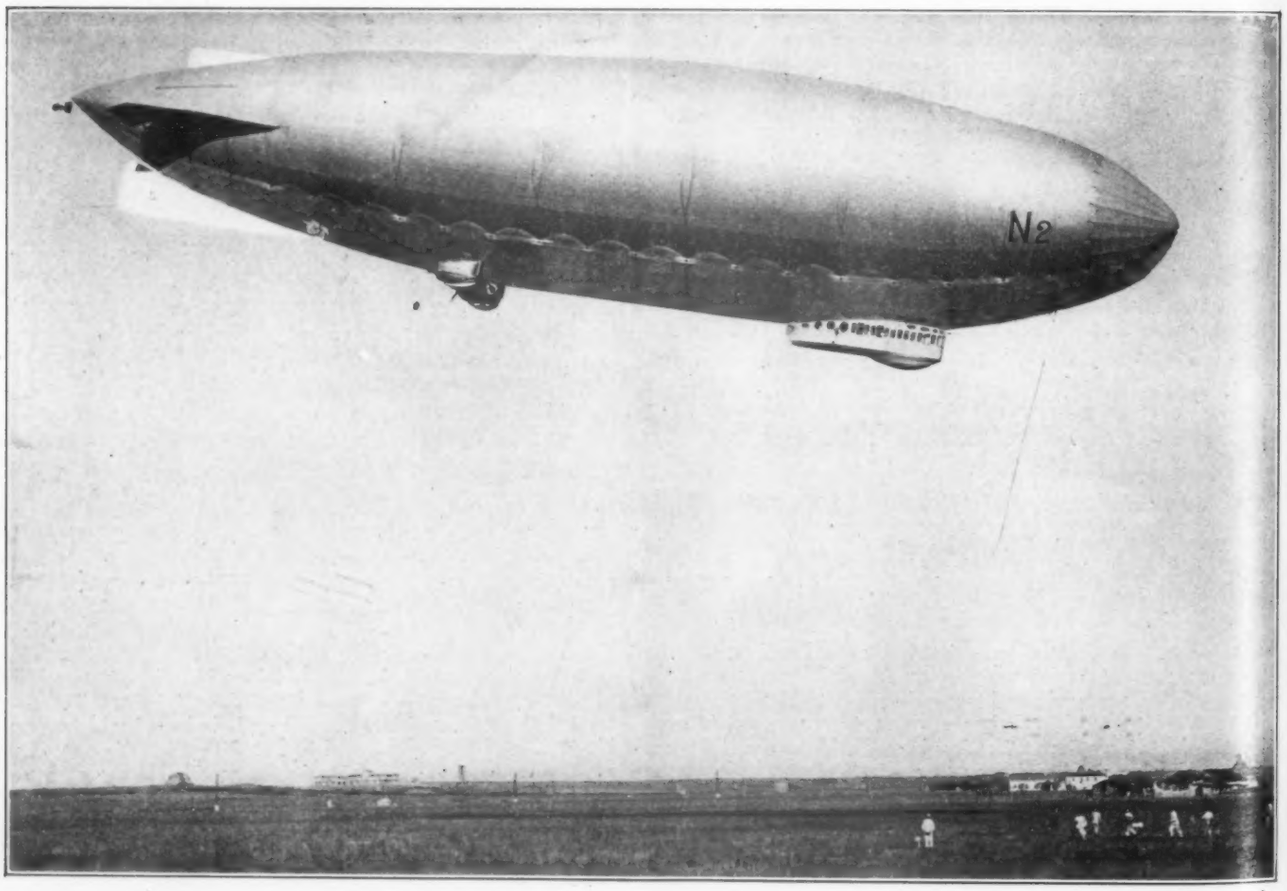
Italy, has been slower in taking to air transport than the European countries of Northern Europe although there has been a line in operation down the River Po from Turin to Trieste for several years. This year, a determined effort is being made to utilize air transport to a greater extent and the line from Genoa down the coast to Palermo in Sicily is one of the results. Later, it is planned to operate a line from Brindisi on the heel of Italy across Greece to Constantinople. No one who ever flies the Dornier Wal seaplane from Genoa will ever again say that air trips along coasts, that have natural beauty, are not the most pleasant that can be found. To fly along the Italian Riviera and pass Pisa with its leaning tower, and then see the islands of Elba and Monte Cristo with a landing on the historic River Tiber near Rome, combines scenic beauty, historical interest as well as the luxury



The N2 leaving its hangar

of air travel. This trip that is flown by the Italian Societa Anonima Navigazione Aerea, which is shortened into S.A.N.A. is one that Moussolini has been encouraging to the limit. It gives visitors to Italy an opportunity of seeing a part of the country that has been almost inaccessible heretofore.

At Rome, while not an air line terminus the landing in the Tiber being made at Ostia a seaside resort about twenty miles from the city, an opportunity was offered to fly over the Eternal City in both a Vought plane and an Italian airship. These flights, one with Major Scanlon of the American Air Corps, and the other through the courtesy of the Italian Air Force were two of the rarest experiences of the air tour. To see from the air, at one sweep of the eyes, the Colosseum,



The N2, Italian airship in which Mr. Gardner flew over Rome

the Forum, St. Peter's and the Vatican, the Victor Emanuel II monument and the hundreds of other interesting buildings of the city built on seven hills is another of the experiences that only air sightseeing can give. At a later time the two interesting flights will be described more in detail. They are mentioned here only to express the appreciation that is due for the extraordinary opportunity that was made available for this air tourist.

Naples—The Beauty Spot of the World

Continuing from Ostia, South, a short flight of an hour and a half along the picturesque Italian coast brings the Bay of Naples into view. And when the traveller tries to describe the circling of this beauty spot of the world he finds that his stock of superlatives will not suffice to give any adequate idea of the sight. With Vesuvius, belching its cloud like smoke; Pompeii and Hurculaneum at its base; the famed island of Capri out to sea; the shoreline dotted with beautiful villages and finally Naples spreading upwards on the slopes of the terraces—only a poet or a painter could do justice to the view. For many years the fame of this bay has been spread to all parts of the world. "See Naples and die" has become a trite saying. With the advent of the S.A.N.A. air line this expression may be changed to "See Naples by air and live".

Two and a Half Hours over Sea

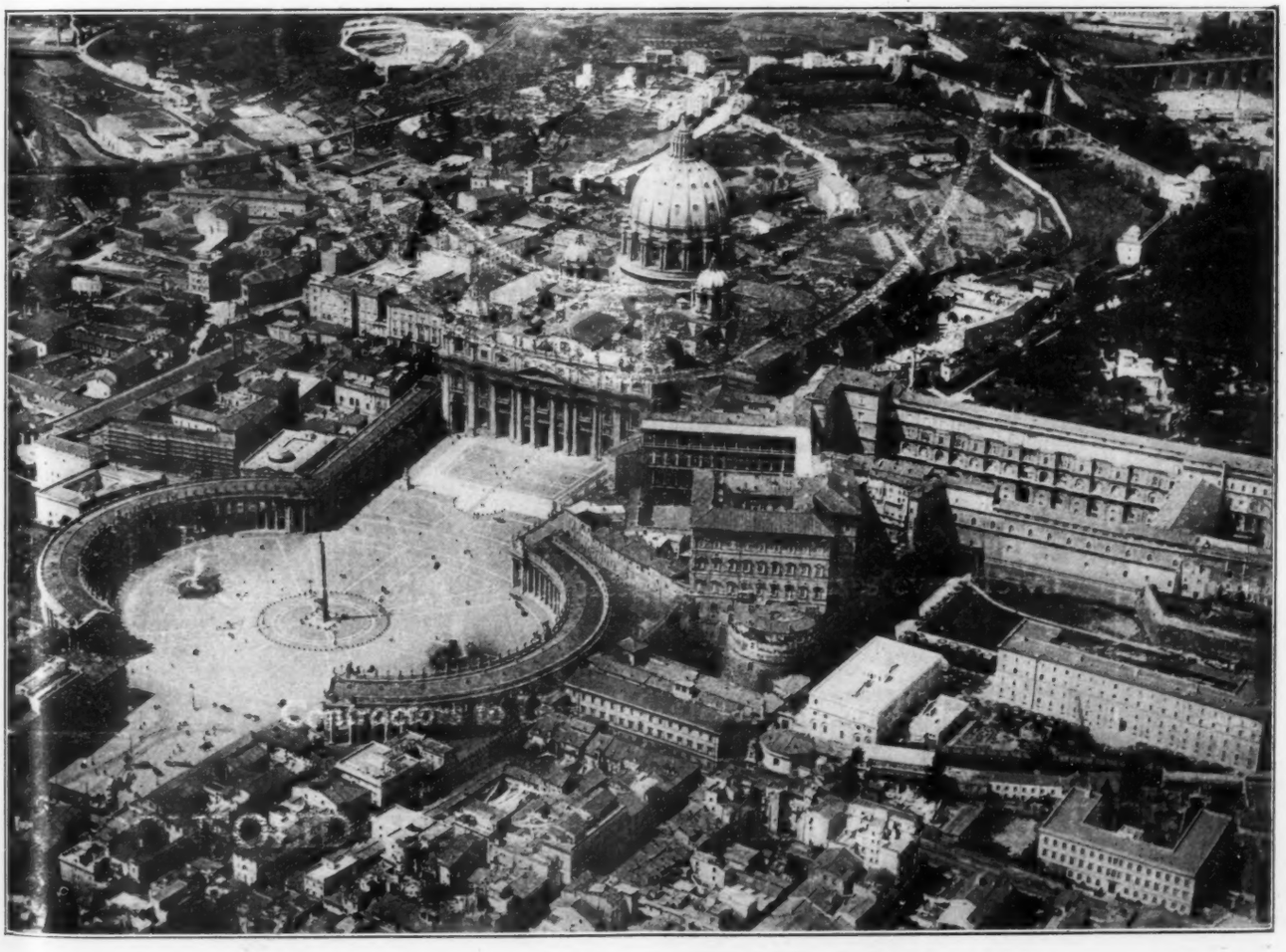
Hardly less attractive is the termination of the flight across the Mediterranean to Palermo, the largest city on Sicily. The sea trip in the twin engined Dornier Wal takes about two hours and a half and to those who have enjoyed the Bay of Naples, the scene at Palermo will have an equally impressive charm. Quite different, but also unique among the beautiful cities of the world, the terminus of this wonderfully scenic air line will attract visitors from all parts of the world. While the air trips by land are of the greatest interest, this new air line along the coast of Italy holds a promise for the air tourist that makes it a thing apart in the world of air transport. Not only does it render a real service in the saving of time and afford all conveniences but it has also the great appeal for the visitor who wishes to view the sunny land of Italy from a new and more beautiful angle. If the travelling public does not flock to fill the seaplanes that this line will operate it will be missing one of the most perfect air trips in the world.

Fusion of French Air Companies Completed

A fusion of the Air-Union, one of the largest of the French air companies and the Aero-Navale, a smaller French company operating seaplanes over the Mediterranean from Antibes to Ajaccio, Corsica, has recently been completed. The Air-Union accepted the stock of the latter organization at its par value, it is understood.

The Air-Union operates the line Paris-London-Marseille and the fusion of the two companies will permit the carrying out of plans for a single line between London-Paris-Lyon-Marseille-Ajaccio and Tunis. Flying time from London to Tunis over the projected route is estimated as 14 hr., as compared with a train and boat schedule of 4 days at the present time.

Steps will be taken at once to transfer the French base of the Aero-Navale from Antibes to Marseille, thus adding a direct link, Marseille-Ajaccio, to the Air-Union route.



St. Peter's and the Vatican as seen from the airship N2

The French Duration Record

World's records are being beaten so fast that it is hard to keep track of them. The Arrachart brothers had hardly left on their return flight from the Persian Gulf back to Paris, when another French plane, piloted by Captain Girier, with Lieutenant Dordilly as pilot, beat their performance. These two pilots made a non-stop flight from Paris to Omsk, Siberia, July 14-15, covering 4700 kilometers in 29 hr., and beating the Arrachart brothers' performance by almost 400 kilometers.

The plane piloted by Captain Girier was a standard French Army biplane of the Bréguet 19 type, used for corps observation work. The only changes made were in the addition of two square meters to the wing area, to fit it with the dual control, to slightly increase the tail area and to add supplementary tanks which increased the fuel capacity to 2930 litres. The power plant was a 500 hp., 12 cylinders V type Hispano-Suiza, developing 500 hp., with a direct drive propeller. The plane weighed, fully loaded, 3902 kilograms, of which 2282 kilograms represented the fuel load. With this huge load, carried only by 52 square meters of wing area, it is hardly surprising that the take-off of the plane should have been very long. Captain Girier made three starts before he finally succeeded in getting the plane clear of the ground. He experienced some rough weather over the Ural mountains and in his telegram to the French Air Dept., announcing his performance, he virtually excused himself for not having done better.

Growth of Commercial Aviation in Italy

The first commercial air line in Italy was inaugurated at Trieste on April 1, 1926, when the Società Italiana Servizi (S.I.S.A.) began operations between Trieste and Turin, with stops at Venice and Pavia. Up to June 1 the company maintained flights every other day, but on that date daily flights were instituted. The S.I.S.A. operates CNT-10, three-engine seaplanes, built in the shipyards of the Cosulich Co., at Monfalcone. The number of planes has been increased from four to eight.

During the first two weeks of April, the first fortnight of operation, 16 trips were made (8 Trieste-Turin and 8 return), and 85 passengers were carried in both directions. A total of 386 kg. of merchandise and 173 kg. of mail were carried. From the 15th to the 30th of April, 15 trips were made, 64 passengers were carried, and 335 kg. of merchandise and 46 sacks of mail were transported.

The Government has granted the S.I.S.A. both mileage and mail subsidies. The mileage subsidy is figured at 11.44 lire for each kilometer of actual flight and for a maximum of 328,000 km. yearly. Such a subsidy is equal to 50 per cent of the cost for a kilometer of flight, which the Government and the aviation company have agreed upon as 22.88 lire per kilometer. The scheduled trip, Trieste-Venice-Pavia-Turin, is considered 575 km. long, so that, on each trip, the company receives a mileage subsidy of 578 lire.

The subsidy for transportation of mail has been fixed at 500,000 lire yearly, for which the company has agreed to carry a quantity of mail not to exceed 28,500 kg. a year. For any mail carried in excess of this amount, the company receives an additional allowance of 15 lire for each kilogram of home mail and 25 lire for each kilogram of foreign mail.

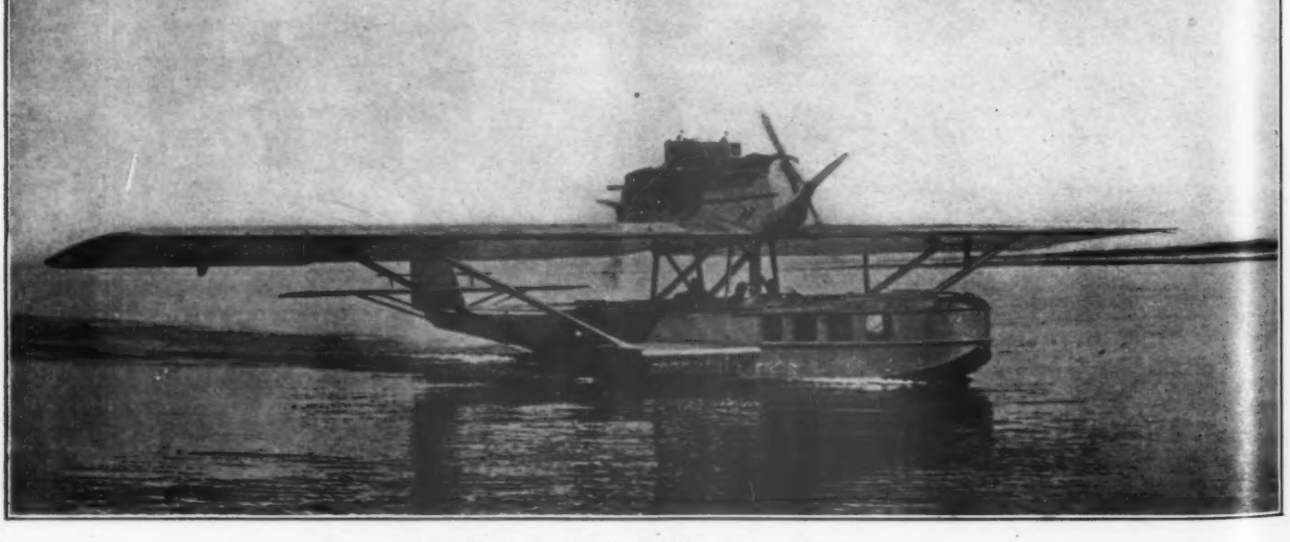
In addition to the foregoing subsidies, the Government has granted to his company the exemption of customs duty, communal tax, and sales tax on gasoline and lubricating oils used for the scheduled trip Trieste-Turin and return, as well as other exemptions of minor importance, such as stamp taxes, registration fees, etc.

The Societa Anonima di Navigazione Aerea of Genoa was founded for the operation of the commercial line, Rome-Genoa-Barcelona (Spain), but pending a full agreement with the Spanish Government, the company has started an air route from Genoa to Ostia, near Rome, thence to Naples and Palermo, and return. This company has three Dornier Wal seaplanes built at Marina di Pisa. Each machine has two Bristol Jupiter engines of 450 hp. and a cabin accommodating 10 passengers.

In consideration of the longer route covered for the line, Genoa-Barcelona, the Government has granted this company a higher subsidy than that granted to the S.I.S.A., 14 lire being paid for each kilometer of actual flight during the first four years of operation. During the following three years it will be reduced to 13 lire per kilometer and for the three years following to 12 lire per kilometer. The average subsidy is figured at 50 per cent of the operation-cost price, which has been agreed upon as 26.20 lire per kilometer of flight. The route is considered to be 1,050 km. long; that is, Rome-Genoa 400 km. and Genoa-Barcelona 650 km. The subsidy will be allowed for a maximum of 640,000 km. flown yearly.

The subsidy for the transportation of mail has been fixed at 300,000 lire yearly, for which the company has agreed to carry 4,250 kg. of mail quartely, or 17,000 kg. yearly. Mail carried in excess of that figure will be paid for at the rate of 15 lire per kilogram for domestic mail and 25 lire per kilogram for foreign mail.

For the transportation of officers and Government employees, the company allows a reduction of 50 per cent from the regular cost price of the ticket. A reduction of 10 per cent is granted to mutilated war veterans and to members of aero clubs and flying associations.



The Dornier Wal landing on the Tiber near Rome

Power Plant Aspects of the National Air Races

Advent of Air-Cooled Pursuit Planes Outstanding Development of the Past Year

By COMDR. E. E. WILSON, U.S.N.
Chief, Power Plant Section, Bureau of Aeronautics

FROM THE viewpoint of a power plant engineer, the National Air Races have a number of interesting aspects. At the Aeronautic Meeting of the Society of Automotive Engineers held the week before the races, it was pointed out that air-cooled engines had abandoned the defensive and taken the offensive. The National Air Races confirmed this statement.

This was particularly striking in the races for commercial airplanes. Just as the Ford Reliability Tour brought out and demonstrated the superiority of Wright Whirlwind "J" engines, so did the National Air Races emphasize the value of this type of engine. The performance of the Wright-Bellanca with the J-5 Whirlwind engine was most interesting. In Event No. 17, the Transport Race, this job carried a contest load of 1650 lb. and averaged 121.28 m.p.h. over the closed course. In the same race, the Buhl-Verville Airster, with a Wright Whirlwind engine, carried a contest load of 1059 lb. at a speed of 119.97 m.p.h. The Ford Air Transport, with three Whirlwinds carrying a contest load of 2666 lb. averaged 114.997 m.p.h. It is understood that this machine was prepared to take off with 1000 lb. more contest load but that the condition of the field made this undesirable.

We have exemplified in this race two different types of commercial aircraft. The Wright-Bellanca and the Verville Airster are small planes capable of carrying a large pay load at a good speed. Their characteristics are such as to indicate their adaptability to airline work where mail and express are being carried. They are also adapted to passenger service over routes having numerous landing places.

The Ford Air Transport is a fine example of the multi-engined type capable of carrying very heavy loads at a good speed and particularly adapted to carrying passengers over routes where landing fields are few and far between. The average speed of this machine was considerably in excess of the expectations of many, and its maneuverability, as demonstrated by Schroeder on Saturday afternoon at Model Farms Field was most impressive. Another example of the light commercial plane is the Travel Air which was flown with 660 lb. of contest load at 127.2 m.p.h. in Event No. 11, the light Commercial Race.

Comdr. E. E. Wilson, U.S.N. Chief, Power Plant Section, Bureau of Aeronautics.

These single-engined 200 h.p. aircooled airplanes are good examples of very useful machines designed about comparatively low powered air-cooled engines. Their performance

The Navy Curtiss Hawk fighter equipped with the Pratt and Whitney Wasp air-cooled engine.

and characteristics compare most favorably with some of the best models of 400 hp. water-cooled installations. From an economic standpoint, it would appear necessary to carry a commercial load on the minimum possible power output. Certainly the Bellanca, the Airster, and the Travel Air with Whirlwind engines meet these requirements.

The Value of the 200 hp. Class

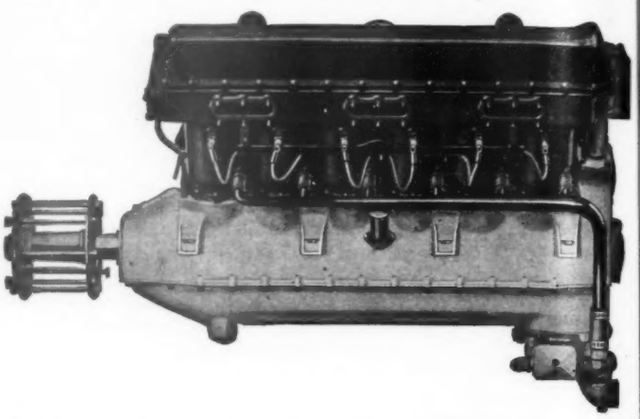
The three-engined commercial installation, as exemplified by the Ford Air Transport and the Fokker Tri-motor, are doing a great deal to popularize passenger transportation. The striking success of the P.R.T's Philadelphia-Washington line, which has recently been extended to Norfolk, Virginia, indicates the possibilities of multi-engined planes on well selected routes. The three-engined airplane appeals to the public because there are three visible and tangible indications of engine reliability. Our American 200 hp. air-cooled engines are rapidly establishing a record of dependability and durability which will help continue confidence in passenger transport. The 200 hp. size of radial is a most useful one and its wide popularity in commercial airplanes is well earned.

Air-cooled engines in the military races likewise established themselves. In the "Free-for-all Pursuit" Race, all three places were taken by water-cooled engines, but the Wright Apache with a Pratt & Whitney Wasp engine, flown by Lieut. C. C. Champion, put up a performance which was surprising even to many people who had been familiar with the development. Another entry which performed surprisingly well was the air-cooled Liberty installed in a Curtiss P-1 and flown by Lieutenant Crumrine, U. S. Army Air Corps. Unfortunately, both of these entrants were disqualified, along with four other contestants, so that the speed developed by them do not appear in the official figures. However, one could gather from the bulletin board that the air-cooled Liberty averaged 167.7 m.p.h. around the closed course and flew with great consistency.

On the first few laps of the race, the Apache did 173 m.p.h. There has been considerable skepticism as to the ability of air-cooled radials to withstand high crank speeds, but this was dispelled when the Apache finished the race, having been turning 2270 r.p.m. During the latter half of the race, the Apache's engine was turning 200 r.p.m. less than during the first half. The indications are that the engine was not sufficiently cowled and was running too cool, for the particular type of spark plugs used in the race.

Lieut. C. C. Champion and the Apache with the Wasp engine

When compared with the speed of 180.49 m.p.h. developed by Lieutenant Cuddihy's Packard Boeing Fighter, the speed of the two air-cooled entrants is particularly interesting if it is remembered that Cuddihy's Packard 2A-1500 engine was utilizing pistons with a compression ratio of 7.65 to 1, while the air-cooled engines were using normal 5.3 to 1 compression ratios. It is understood that the Curtiss V-1400 engine in



The Packard 1500 engine (600 hp.) of the type with which Lieutenant Cuddihy's Boeing Fighter was fitted. The plane won the pursuit plane race at 180.49 m.p.h.

Lieutenant Elliott's P-2, which took second place with 178.609 m.p.h., was likewise a high compression engine. The Pratt & Whitney Wasp was a stock engine, the second one to be built, and it was using normal compression with no unusual equipment except the first two American-built Scintilla magnetos. In the light of these details, the performance of the air-cooled Liberty and the Pratt & Whitney Wasp are most illuminating. During the S.A.E. Aeronautic Meeting, it was stated that the air-cooled engine was challenging the water-cooled engine even in the pursuit field. The results of this race indicate that they are making a very successful bid for a crown.

To all power plant engineers, the demonstration of dependability was most impressive. Fourteen planes entered the "Free-for-all Pursuit" Race, and flew the full circuit wide open, many of them with the engines developing considerably in excess of the normal service output. There were no indications of engine trouble of any kind, and any engine trouble would have been very serious under the conditions which pertained. As an all-around example of the general dependability of American aircraft engines, this pursuit race should be a source of great satisfaction. The Air Corps Engineering Division at McCook Field can justly be proud of the performance of their air-cooled Liberty, and the Pratt & Whitney Aircraft Company can find great satisfaction in the conduct of their Wasp, particularly since the company was but thirteen months old at the time of the race.

Racing always tends to focus attention upon the sea level performance characteristics of our airplanes. It is a great satisfaction to see high speeds at sea level since these are to a certain extent indicative of the performance at the fighting altitude. It behooves us, however, to avoid a sense of smug satisfaction with the results of our racers and to pay more attention to what our service types can do at altitude. Since, now, air-cooled engines, by virtue of reduction in power plant weight, insure us for similar powers, increased performance at altitude, it is of the greatest moment, that modern air-cooled engines do not have to concede anything to water-cooled engines insofar as speed at sea level is concerned. The advent of the air-cooled radial into the pursuit field as a proper competitor of the water-cooled engine is, then, one of the outstanding developments of the past year.

Comments on the Races

Civilian Planes Typify Excellence of Independent Civilian Design

ONE OF the salient features of the races was the almost complete absence of Jennies, Standards or other war surplus planes. There were none of these old planes entered in any of the civilian events and only one or two appeared at the field. Three years ago at the National Air Races were practically nothing but these old planes and in this respect the meet showed the progress which has been made in the types of commercial aircraft in use. The one exception was the National Guard Race in which nothing but Jennies were entered. This is not the National Guardsmen's fault and it does seem unfortunate that these volunteers who are not in continuous flying practice should be forced to fly such antiquated planes.

Metal Construction

Another point was the universal adoption of the welded steel fuselage by the commercial manufacturers. Outside of planes manufactured before 1920 and one modern plane of Navy design all the planes entered in the civilian races had metal fuselages. There were, however, no civilian metal wings with the exception of the Ford three-engine job. The latest Army bombers use welded steel wing beams but these are still covered with fabric. It is hoped that next year will see more metal covered planes in the civilian line up.

There were a great variety of landing gears and there does not seem to be any special type which has a monopoly, although the split axle seems to be coming into favor. There were even two racing planes with no shock absorbers at all and this aroused speculation as to the real need for all the effort which has been put into landing gears.

The number of planes in attendance at the meet was disappointing. Although there was more prize money, there were not many more planes than at Mitchell Field last year and the number fell far short of the Mid-West air meets. The number of visiting planes which were not entered in any of the events was practically nil. "Hell's half acre" was conspicuous by its absence. There probably were two chief reasons. The first was the fact that there are not so many planes on the Atlantic seaboard as there are in the Mid-West. The second will apply to the West as well as to the East. Pilots have begun to realize that no stock job can win any of the speed events. Tricked up planes or planes designed especially for the event have been winning the big prize money for the past couple of years. As a result, the pilots with planes which can be used for ordinary passenger work do not care to wear out their engines in a race which they cannot win. Few private owners or even professionals were willing to fly the Alleghanies unless they were pretty certain of winning prize money.

A Lightplane Over the Alleghanies

While on the subject of flying to the meet, congratulations are to be extended to Fred Hoyt on his sporting trip across the continent in an OX-5 Travel Air. To fly 2,500 miles and return in order to attend an air meet is quite a stunt and everyone was glad that Hoyt won the "On-to-the-Sesqui" and placed in other events. Another notable flight was that of Jack Laass in the little Driggs Dart powered with the Wright Morehouse 30 hp. engine. Laass flew from Dayton to Philadelphia by way of Moundsville and Washington. The weather was rather bad and several large machines were held up. Such flights will do more to prove the possibilities of lightplanes than any amount of racing. Henry DuPont's flight from Detroit to the races was also a good performance. Young DuPont owns a Buhl-Verville Airster with a Whirlwind engine and flies chiefly for pleasure. He has become interested in racing and, as the only private owner, he certainly put up a good showing in the races which he entered.

The timing of the races was done by Odis A. Porter and Chester S. Ricker, directors of timing at the Indianapolis Motor Speedway. The speedway organization loaned their electrical timer which is the most accurate in the world, recording to one quarter of 1/100 of a sec. The Monroe Calculating Machine Co. of East Orange, N. J., loaned an operator and a most amazing machine which converted cumulative lap time into miles per hour. When ten or fifteen planes are entered and they bunch at the pylons the timing is no easy matter.

The races were arranged this year with a view of encouraging the manufacturers of civilian planes. The field was under civilian management and comparatively little of the prize money went to the military races. As a result, every civilian

One of the Huff Daland Dusters used in combating the boll weevil and other insect pests throughout the country. These planes operate very close to the ground and use Wright Whirlwind 200 hp. air-cooled engines, exclusively. One of these machines was on show during the Air Races.

manufacturer of importance was represented. Waco, Travel Air, Swallow, Alexander, Buhl-Verville, Ford all had planes in the races, most of them being entered by the manufacturing company or its representatives. The meet was truly representative of American aerial service. Fokker and Sikorsky had planes at the field but they took no part in the races. The Army Air Corps brought out all its representative types for the various races. Observation, bombing, and pursuit planes raced around the course and an outsider would have received a comprehensing idea of the various military types of aircraft had he stayed throughout the races. The only type of airplane which was not really fully represented was the air transport plane. The Ford and the Wright-Bellanca were the only two planes designed primarily for transportation which were entered in any of the events. None of the planes in use on the air mail lines were represented. There were no Carrier Pigeons nor Douglas Transports nor any of the planes which figured in the air mail competition. Certain planes such as the Travel Air and Buhl-Verville were competing but these planes and also the Ryan which, unfortunately, was not present, were designed primarily for aerial service and sport purposes. It was unfortunate that none of the big government manufacturers except Chance Vought had any of their latest types of commercial aircraft entered in the civilian races. The air line operators could hardly afford to enter their planes and the manufacturers did not have any available for show purposes.

The Wild Stunts

The field arrangements were excellent. The planes flew directly in front of the crowd and turned the pylons at about the center of the space reserved for the spectators. The boxes were well placed but not too elaborate. Good refreshments were provided for and if it had not been for the torrential rains the visitors would have been thoroughly comfortable. As it was, the ground was very muddy and rubbers were in order. "Swanee" Taylor on the loud speaker kept up a constant chatter of comments which were both amusing and instructive. Various stunts were staged such as the old lady aunt from Iowa who got into the slipstream of a plane and had her clothes blown off revealing a bathing beauty. Miss Mid-West also had a misadventure when she accidently opened the throttle of the plane in which she was sitting and it proceeded to fly off with her. Fortunately she had great presence of mind and after much wild flying she brought the plane safely to land. Clowns performed during the dull moments and a real effort was made to keep the crowd amused and interested.

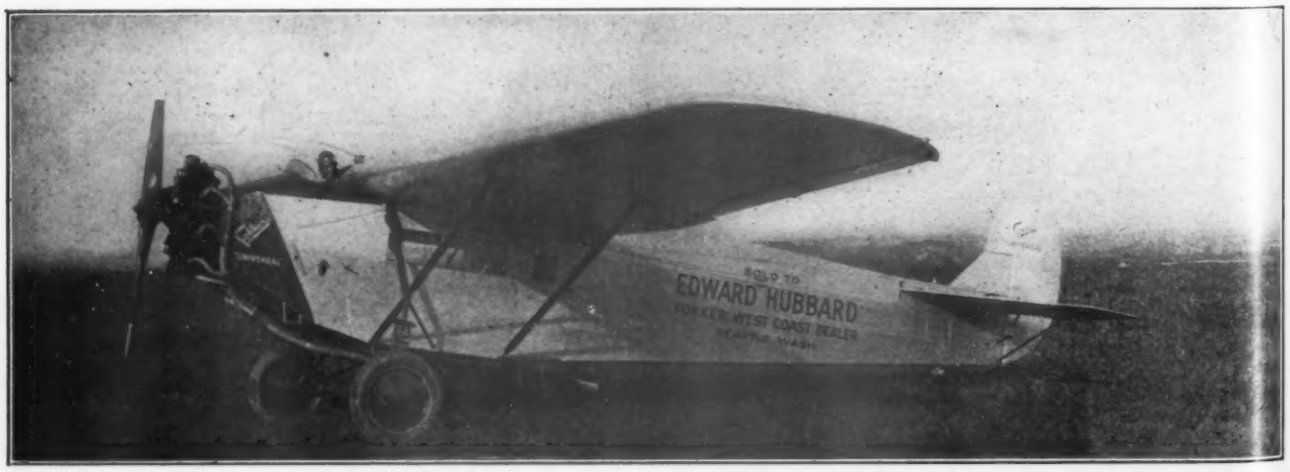
The crowd however, seemed to get its greatest thrill from the Army, Navy and Marine Corps pursuit plane formation flying and stunting. When three planes would dive from the skies with their propellers screaching, the crowd was greatly excited and with good reason for the maneuvering and evolutions of the planes were truly extraordinary. The parachute jumping was held after the other events of each day and, as these often ended late, much of the crowd had left which was unfortunate as even the most blasé aeronautical fan gets a thrill out of a parachute jump.

The Fairchild-Caminez engine which is exhibited in the Aeronautic Exhibit at the Sesqui-Centennial Exposition at Philadelphia. This photo shows the engine during flight testing in an Avro plane.

Passes were given out very freely and as visitors were allowed on the field after the races were over they had a good chance of examining the planes. All the visiting planes were lined up right in front of the fence so that they could easily be seen. The visiting pilots seemed well contented with the treatment which they received and the only criticism was that a week was rather too long for an air meet. Stretching the events over two week-ends probably brought in more money, but the meet somewhat lacked the pep of a show which is more concentrated and pilots, operators and manufacturers found it difficult to spend so much time way from their normal work.

A Plea for the Two-Seater Sport Plane

Many people mentioned with regret that there were not more entrants in the 300 cu. in. class for two-seater sport planes and expressed the hope that next year's races would bring out good examples of this much needed type. There is certainly a market for the two-seater plane which is smaller and handier than the three-place OX-5 planes and the National Air Races are one of the mediums through which such a type could be encouraged.



At Model Farms Field—one of the new Fokker Universals (Wright Whirlwind)

The lightplane races were practically the only purely sporting events of the meet. The Kreider Reisner Co. had built two planes especially for the races and the Heath Tomboy also would probably not have been built had it not been for the races. Three of the Driggs Dart planes have already been built and though they have a high speed wing they actually are more like cross country than racing jobs. Three out of the four lightplanes entered can, then, be said to have been built for racing. With certain fixed limitations to the size of the engines, the lightplanes are developing into a racing class similar to the racing motor boats or speedway automobiles. No six foot man could have crowded himself into any of the planes and they all need a skilful pilot at the stick.

From the records at the six National Air meets it would seem as though airplane racing was comparatively safe but not very interesting to the spectator. It would be interesting if the lightplane developed into a racing craft which, flying around a short course, would afford an interesting and exciting spectacle for the onlookers. One of the satisfactory results of the meet was proof that a good American lightplane engine had been produced in the Wright Morehouse.

Excellence in Civilian Designs

One of the interesting things in the meet was the evidence of skill among the civilian designers. The military and civilian types in this country are developed along very different lines and it is hard to make any exact comparisons but one could not be present at this year's races without realizing that there was very real ability among the civilian designers. The greater freedom under which the civilian designers work was also in evidence. Exclusive of lightplanes, there were four civilian monoplanes at the races, none of which were military. The only all-metal plane was of civilian manufacture. In the matter of fittings, landing gears and engine mounts, etc., there was much more variety among the civilian planes, than among the military and certainly an equal amount of ingenuity. When it came to performance there were few comparisons possible as the military planes were all of higher horsepower than were the civilian planes. There was, however, one Navy plane equipped with a Wright Whirlwind engine and the civilian planes equipped with the same engine certainly surpassed it in performance. Comparisons however, are not fair as the Navy machine was built for catapulting and for deck landing and must have factors of safety which are not necessary in planes such as the Wright Bellanca, Buhl-Verville or Travel Air. In the same way, it is unfair to draw comparisons between the Pitcairn Sesqui-Wing Arrow or the Curtiss clipped wing Oriole, and the Army observation planes which made approximately the same speed on one-third the horsepower. It can, however, safely be said that the United States is developing a group of purely civilian designers who are producing planes which, in their fields, are the equal of planes designed for military purposes.

Philadelphia, Pa.—Norfolk, Va. Air Mail

Postmaster General New on Sept. 9 accepted 45 day notice tendered by the Philadelphia Rapid Transit Corp. for discontinuance of contract air mail service between Philadelphia and Washington and immediately readvertised for bids for similar service between Philadelphia and Norfolk by way of Washington. Bids are returnable Sept. 25 with a view to inaugurating the extended service by Oct. 1.

The Philadelphia Rapid Transit Corporation, under Mitten Management, began passenger air service between Philadelphia and Norfolk on Sept. 13 and, it is understood, has re-bid on contract for the extended route.

The proposed service is expected to prove of material benefit to coast-wise trading vessels, saving a full days' time in the delivery of cargo manifests to New England steamship companies. A similar saving in time will, of course, be made on other New England mail.

The new service also will place Norfolk in contact with the overnight air mail service between New York and Chicago. Mail leaving Norfolk in the afternoon would be delivered in Chicago, Milwaukee, St. Paul, Minneapolis, St. Louis, Kansas City and intermediate cities the following morning.

Whirlwind Record With Varney Air Mail

During seven weeks of steady operation, from June 1 to July 18, the Varney Air Mail has completed every flight started except one, on schedule time. The one and only failure in a schedule flight, and also the one and only forced landing since they installed Whirlwind engines in their Swallow mail planes, was due to a gasoline line failure.

Wide World

Asst. Sec. Warner inspecting the Whirlwind engine in a naval air service plane at Squantum, Mass.

In seven weeks of operation, the five Whirlwinds have piled up 487½ hr. flying time, and not a single engine has given the slightest kind of trouble. The fuel consumption for June was 10.2 gal. per hr., and, in the hot July weather, only reached 11.4 gal. per hr. Most flights were completed with an average consumption of 10 miles per gal. The oil consumption varies from 1.8 to 2 qts. per hr. The oil is drained every 12 hr. and 5 gal. of fresh oil put in the tank. It is very seldom necessary to add any oil during the twelve hr. period.

The fastest round trip yet made by the Varney Air Mail over the Boise, Idaho, to Elko, Nev., route, was made on June 5 by Pilots Franklin Bose and Clarence Price. Their average speed for the 550 miles was 118.7 m.p.h.

The conditions under which this flying is being carried out, makes a speed of 118 m.p.h. truly remarkable. The distance from Boise to Elko is 275 miles airline over high desert country, with two mountain ranges rising to an altitude of 12,000 to 16,000 ft. and perpetually covered with snow. The average height at which the planes fly on this trip is 10,000 ft. The field at Boise is 2700 ft. above sea level and right at the base of another range of mountains. The field at Elko is 5000 ft. above sea level. The record made by the Varney Air Mail does great credit to the management, the pilots, the Swallow planes and, finally, the Whirlwind engines.

The Bureau of Aeronautics, Navy Department, continues to receive reports of very satisfactory Wright Whirlwind J-4 engine performance. The Naval Reserve Unit at Squantum, Mass. has now completed over 400 hr. flying with a Wright J-4 engine. During the last 100 hr. operation this engine has performed even more satisfactorily than before. The U.S. Naval Reserve Air Unit at Rockaway Beach, L. I., has been operating three J-4 engines. These have total times of 390, 350 and 180 hr., respectively, without a forced landing or any except minor difficulties. The results obtained at these Naval Reserve Stations indicate the high degree of engine development achieved by the Wright Aeronautical Corp.

The Proposed Air Regulations

Regulations to be Discussed at Meetings at Department of Commerce in October.

THE FOLLOWING tentative draft of regulations for the licencing of pilots and aircraft of the United States has been proposed by the Department of Commerce in collaboration with the Army Air Corps and the Naval Air Service:

AIR REGULATIONS
Chapter One
DEFINITIONS

For the purpose of these regulations:

1. Acrobatic flying means intentional maneuvers not necessary to air navigation.
2. Aircraft means "any contrivance now know or hereafter invented, used or designed for navigation of or flight in the air, except a parachute or other contrivance designed for such navigation but used primarily for safety equipment." (Sec. 9c)
   Aircraft of the United States means "any aircraft registered" under the Air Commerce Act. (Sec. 9f)
3. Airplane means a mechanically driven aircraft, heavier-than-air, provided with fixed wings, and supported by the dynamic action of the air.
4. Airworthy means a condition meeting the minimum requirements of these regulations as to structural strength, materials, workmanship, flying qualities, power plant installation, and engine and navigational equipment.
5. Balloon means an aerostat the form of which is maintained by the pressure of a contained gas lighter than the surrounding air.
6. Flying means movement of aircraft not in contact with a supporting surface.
7. Full load means the structure, power plant, fixed equipment, water in the radiator and cooling system, all essential instruments and furnishings, fixed electric wiring, crew, passengers, cargo, oil, fuel, and removable equipment.
8. Landing means coming in contact with a surface capable of supporting aircraft and includes the immediately preceding and succeeding acts.
9. Passenger means a person not the pilot or member of the crew.
10. Prohibited area means an air space reservation established by the President or by a State.
11. Registration means entry in an official registry of the Secretary of Commerce as an aircraft of the United States.
12. Taking-off means abandoning the supporting surface and includes the immediately preceding and succeeding acts.
13. Taxiing means running an airplane over the ground, or a seaplane on the surface of the water, under its own power.
14. Underway means an airplane moving under its own power.

Chapter Two
CERTIFICATION OF AIRCRAFT

1. REGISTRATION—LAW:
   " 'Air Commerce' means transportation in whole or in part by aircraft of persons or property for hire, navigating of aircraft in furtherance of a business, or navigating of aircraft from one place to another for operation in the conduct of a business." (Sec. 1, Air Commerce Act.)
   " 'Interstate or foreign air commerce' means air commerce between any state, territory, or possession, or the District of Columbia, and any place outside thereof; or between points within the same state, territory, or possession but through the airspace over any place outside thereof, or wholly within the airspace of any territory or possession, or the District of Columbia." (Sec. 1, Air Commerce Act.)
   "The Secretary of Commerce shall, by regulation—Provide for the granting of registration to aircraft eligible for registration, if the owner requests such registration * * * " (Sec. 3a)
   "It shall be unlawful— * * * —to navigate any aircraft * * * in interstate or foreign air commerce unless such aircraft is registered as an aircraft of the United States." (Sec. 11 (a) (2))
   "To navigate any aircraft registered as an aircraft of the United States * * * without an aircraft certificate, or in violation of the terms of any such certificate." (Sec. 11 (a) (3))
   "Any person who (1) violates any provision of subdivision (a) of this section * * * shall be subject to a civil penalty of $500 * * *." (Sec. 11 (b))
2. APPLICATION OF THE LAW: Registration is required when aircraft is engaged:
   (A) In carrying persons or property for hire, or the mails:
      (1) between two or more states or to or from foreign countries; as from Chicago to Dallas, Tex., or from New York, or Portland, Me., to Montreal, Canada.
      (2) between two points in one state if a part of the flight is over another state, as from Buffalo to New York via Susquehanna, Pa.; and,
      (3) Between two points in one state if it is a part of a through carriage between points in differen states, or countries, as from Los Angeles, to San Francisco, Calif., as a part of the carriage between Los Angeles and Seattle, Wash., or from El Paso, Tex., to Marfa, Tex., as a part of the carriage between El Paso and Chichuahua, Mexico.
   (B) In flying between points in different states or to or from any foreign country:
      (1) in furtherance of a business, as a manufacturer transporting his products from factory to branch plant, and
      (2) for the operation in the conduct of a business, as where the aircraft is used in a business in one state and is flown to another state for use in the business in that state. Applied to concrete facts it includes the aircraft which is used in State A for exhibition purposes, or for the carriage there of persons or property, and is flown to State B for exhibition purposes, or for the carriage there of persons or property.
3. AIRCRAFT BELONGING TO THE UNITED STATES: Aircraft belonging to the United States will be registered by the Secretary of Commerce if the operating agency so requests.
4. AIRCRAFT BELONGING TO STATES, ETC.: Aircraft belonging to States, Territories, or Possessions of the United States, or to political subdivisions, will be registered by the Secretary of Commerce and rated as to airworthiness in the same manner as other craft, if request for registration is made, and such craft are used exclusively in governmental service.
5. FOREIGN AIRCRAFT: Where civil aircraft of the United States are permitted to fly over a foreign country without registration and rating and certification of their airmen, the aircraft of such foreign country, not a part of its armed forces and the airmen serving in connection therewith, may operate in the territory over which the United States has jurisdiction, without registration, rating or certification. Such foreign aircraft will not be permitted to engage in interstate or intrastate air commerce.
6. REQUISITES OF REGISTRY: An aircraft to be entitled to registry must be owned by:
   (A) a citizen of the United States, or
   (B) a partnership of which each member is a citizen of the United States, or
   (C) a corporation organized under the laws of the United States, a State, Territory, or Possession of the United States, and of which the President and at least two-thirds of the directors or managing officers are citizens of the United States, and of which at least 51% of the voting interest in the corporation is controlled by citizens of the United States, or
   (D) the Government of the United States, a State, Territory, or Possession, or a political subdivision thereof, and used exclusively in the governmental service.

   No civil craft is eligible to registration if it is registered under the laws of any foreign country. (Secs. 3 a and 9 a)
7. AIRWORTHINESS, LAW OF:
   "The Secretary of Commerce shall, by regulation—Provide for rating of aircraft as to their airworthiness * * *. The Secretary may, from time to time, rerate aircraft as to their airworthiness upon the basis of information obtained under this subdivision." (Sec. 3 (b))
   "It shall be unlawful * * * to navigate any aircraft registered as an aircraft of the United States without an aircraft certificate or in violation of the terms of any such certificate."
   "Any person who violates any provision of subdivision (a) of this section * * * shall be subject to a civil penalty of $500." (Sec. 11 (b))
8. APPLICATION FOR REGISTRATION AND RATING AS TO AIRWORTHINESS: Before any aircraft is registered the owner shall execute and file with the Secretary of Commerce an application, under oath, for a certificate of Registration and Airworthiness. A copy of the application is shown in the appendix. If the aircraft is already registered in the name of a person other than the applicant, the application must be accompanied by the original bill of sale or a certified copy of it.
9. INFORMATION ACCOMPANYING APPLICATION: The application for registration must be accompanied by the following information:
   (A) Three View Drawings of the airplane with main dimensions, aerodynamical and other characteristics, and also a balance diagram;
   (B) Description of power plant installation with illustrative diagrams;
   (C) Description of cockpit, cabin and control arrangements with illustrative diagrams or drawings;
   (D) Description of structure, (wings, fuselage, tail surfaces, chassis) with drawings or dimensioned sketches of main structural members, and statement as to material employed, accompanied by a stress analysis. The stress analysis must show the name and qualification of the engineer who made it, and will be treated as confidential. If the applicant is other than a manufacturer of the aircraft he may, in lieu of furnishing the stress analysis, refer to the filing of the analysis by the manufacturer.
10. AIRSHIPS AND BALLOONS: The airworthy requirements for airships and balloons will be prescribed by special regulations of the Secretary of Commerce.
11. CLASSIFICATION OF REQUIREMENTS OF AIRWORTHINESS: The following is a classification of the requirements of airworthiness:
   (A) The structural strength of wings, ailerons, tail surfaces, fuselage and landing gear;
   (B) Cockpit, cabin and control arrangements;
   (C) Power plant installation;
   (D) Equipment and instruments;
   (E) Propellors;
   (F) Materials and workmanship;
   (G) Flying characteristics and qualities.
12. STRUCTURAL STRENGTH REQUIREMENTS:
   (A) *Classification:* To determine structural strength requirements airplanes shall be classified according to full load in pounds, as follows:

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The New Curtiss "FALCON"

DURING the past several months, the first group of Curtiss "Falcons" to be delivered to the Army have been undergoing service tests in the hands of Air Corps pilots. As was foreshadowed when the "Falcon" won first prize in the Observation Competition at McCook Field, this new observation airplane has rapidly gained favor with the flying personnel, who have found it much faster and more maneuverable than the present service type.

Powered with either the Curtiss D-12 or the Liberty motor; excellent from a maintenance standpoint; with a truly remarkable performance, the "Falcon" fulfills its advance indications of being the finest observation type in service today - a worthy "big brother" to the Curtiss "Hawk", the standard service pursuit plane of the U. S. Services.

FIRST - SECOND - FOURTH - FIFTH - *in the Liberty Engine Builders' Race for observation airplanes at the Philadelphia National Air Races.*

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FACTORIES:
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Class 1—over 13,500
Class 2—7,500 to 13,500
Class 3—4,500 to 7,500
Class 4—2,500 to 4,500
Class 5—up to 2,500

(B) *Wing truss analyses and load factors:* The wing truss analyses must show high low incidence and inverted flight conditions, and the load factors, for such conditions, as when new, shall be as follows:

Class	*High Incidence*	*Low Incidence*	*Inverted Flight*
1	4.0	2.8	1.6
2	4.8	3.3	1.8
3	5.2	3.6	2.0
4	5.8	4.0	2.2
5	6.5	4.5	2.5

(C) *Aileron and tail surface strengths:* The fixed and auxiliary control surfaces, as when new, shall be designed to withstand the following loads:

Class	*Ailerons and horizontal tail surfaces lbs./sq. ft.*	*Vertical tail surfaces*
1	15	Seventy-five per cent of the load required for horizontal tail surfaces.
2	15	
3	20	
4	25	
5	30	

(D) *Fuselage strength:* The fuselage shall be designed, as when new, to withstand the loads corresponding to the maximum loads required for:
(A) Horizontal tail surfaces;
(B) Vertical tail surfaces, and
(C) Three point and level landing, with following load factors:

Class	*Load Factor*
1	4.5
2	5.0
3	5.5
4	6.0
5	6.5

For nosing over conditions, the front portion of fuselage is to be designed, as when new, to carry 1.5 times the weight of the airplane acting up and normal to the propeller axis and .75 times the weight of the airplane acting back and parallel to the propeller axis.

(E) *Structural strength of landing gear:* Landing gear shall be constructed, as when new, to correspond in strength to the fuselage under loading conditions and be reasonably strong in resisting side loads:

13. CONSTRUCTION OF COCKPIT, CABIN AND CONTROL ARRANGEMENTS:
(A) Cockpits must be constructed:
1. To permit pilot to have adequate vision under normal flying requirements;
2. To afford reasonable protection to pilot and passengers against possible propeller breakage;
3. With fixed seats for passengers, for airplanes with cabins, cabins to have emergency exit panels opening from the inside, seaplanes of cabin type and land planes carrying passengers over large bodies of water, to have additional emergency panel in the cabin roof.

14. POWER PLANT REQUIREMENTS:
(A) Before an engine shall be installed in an airplane it shall be given a two hour bench test, the first half hour of which the engine shall be run at full throttle, the remainder at three quarters of the r.p.m. full throttle. In lieu of the bench test, the same test may be run with the engine installed in the airplane, the airplane to be at rest during the test. No newly constructed airplane or airplane with a newly installed motor shall be used in carrying passengers for hire until after the airplane shall have been tested in flight for at least one-half hour.
(B) The power plant must be equipped as follows:
1. The fuel tanks mounted in locations and manner to minimize shock, vibration, fire and personal hazards;
2. Fuel tanks located to minimize danger to crew from gasoline dripping and ignition.
3. Fire wall, insulating the engine section from other parts of the airplane in case of fire, and provided with fire proof glands or gaskets when pierced by pipes or wires. The fire wall shall be of terne plate at least 0.025 inches thick, or of asbestos with a metallic backing;
4. Carburetor air intakes open outside the fuselage and provided with wire gauze or otherwise protected against back firing;
5. The throttle, mixture and spark controls located convenient to the pilot. The control system of multi-engined airplanes shall be arranged so that the engines may be separately and simultaneously controlled;
6. Ignition wires insulated and installed to afford reasonable protection against accidental discharge of gasoline;
7. Exhaust manifolds and mufflers installed to provide reasonable protection against gasoline falling upon them. The mouth of the exhaust pipe must be placed so that gases cannot reach any combustible part of the airplane;
8. There must be full ventilation against possible accumulation of gasoline fumes;

15. EQUIPMENT AND INSTRUMENTS: The equipment and instruments required for all airplanes are:
(A) Fire extinguishing apparatus for each engine compartment;
(B) First aid and emergency tool kits;
(C) Safety belts for pilots and passengers in open cockpits and life preservers or other suitable equipment for seaplanes and land planes flying over large bodies of water.
(D) 1. Tachometer for each engine;
2. Fuel gauge;
3. Oil and gasoline pressure gauge;
4. Engine thermometer;
5. Compass;
6. Altimeter;
7. Air Speed Indicator.
(E) Airplanes flying at night must also have
1. Turn indicator;
2. Fore and aft inclinometer;
3. Lateral Inclinometer;
4. Lights and parachute flares.

16. PROPELLERS: Propellers on airplanes must conform to the following:
(A) Have ground clearance of at least nine inches when plane is in flying or normal landing position;
(B) Have at least six inches of clearance between propeller tips and other parts of the plane, in case of multi-engined airplanes;
(C) Be balanced and in case of wooden propellers be without open glue joints, and
(D) Be constructed so that on climb and high speed conditions the stress on the materials of the propeller shall not be more than one-third of the ultimate strength of wooden propellers and one-half on metal propellers.

17. MATERIALS AND WORKMANSHIP: The materials used in the construction of airplanes shall be sound and clearly adapted for the purposes for which they are used and the workmanship shall be the highest grade obtainable for practicable purposes. On each aircraft the date of manufacture and the name of the manufacturer shall be stamped.

18. FLYING CHARACTERISTICS AND QUALITIES:
(A) The angle in side view with the propeller axis horizontal, between the vertical through the axle and the line connecting the center of gravity and the axle, should be not less than twelve (12) degrees;
(B) The angle in front view, between the vertical and a line joining the center of gravity and the point of contact between the ground and either outer wheel should be no less than twenty-five (25) degrees;
(C) All airplanes shall be inherently stable longitudinally and laterally and must be controllable throughout the flying range;
(D) With the rudder in a position corresponding to rectilinear flight an airplane must not show a tendency to depart from a straight course.

19. FLIGHT TESTS FOR AIRWORTHINESS: Aircraft, lighter-than-air, upon the basis of standard air and with a full load must pass the following tests, under the supervision of an officer or employee of the Department of Commerce, before the same shall be rated as airworthy:
(A) Airplanes classed as private aircraft of the United States:
1. Take-off, in calm air, within 600 feet, in a straight course, measured from points where wheels begin to revolve to point where wheels leave the ground;
2. Land, with idle engine, within 650 feet, measured from point where wheels touch ground to point where plane stops without external aid, after taxiing in a straight course;
3. Climb at least 400 feet the first minute after taking-off;
4. Maneuver around two posts or buoys fifteen hundred feet apart, by making five successive figure eights in radius not more than 300 feet, at height of 800 feet, without varying more than 200 feet in height;
5. Perform the above flights with no marked tendency of dangerous maneuvering or lack of control.
(B) Airplanes classed as commercial aircraft of the United States:
1. Undergo the same tests as are prescribed for private aircraft of the United States, with these exceptions:
(A) The take-off distance shall be 700 feet;
(B) The landing distance shall be 750 feet;
(C) The climb shall be at least 300 feet the first minute after taking-off.
(C) Seaplanes, classed as private or commercial aircraft of the United States:
1. Undergo the same tests for their respective classes as are prescribed for airplanes, with the exceptions:
(A) The take-off and landing measurements shall be made according to the practice which appears best calculated to practically determine the distances;
(B) The take-off distance shall be 750 feet for private seaplanes and 850 feet for commercial seaplanes;
(C) The landing distance shall be 800 feet for private seaplanes and 900 feet for commercial seaplanes, and
(D) The climb shall be 300 feet the first minute for private seaplanes and 250 feet the first minute for commercial seaplanes.

20. PLACES FOR AIRWORTHINESS TESTS: The Secretary of Commerce will fix the time and place for all tests for airworthiness.

21. CERTIFICATES OF REGISTRATION AND AIRWORTHINESS: A certificate of Registration and Airworthiness will be issued to the owner of each aircraft found airworthy and entitled to registration. It will specify the type of the engine and the authorized full load and will be granted for either full time or day time operation, depending upon the nature of the equipment of the craft. Full time operation will be authorized for craft only when they are properly equipped for night flying.

22. MEMORANDUM FOR MANUFACTURERS: A Memorandum of Airworthiness, a copy of which is shown in the appendix, will be issued to the manufacturer for aircraft owned and in its possession and found airworthy and eligible to registration by the Secretary of Commerce. Upon original sale of such craft in the same condition in which it was found airworthy, and the presentation of the bill of sale or a certified copy of it and a properly executed Purchaser's Affidavit, a copy of which is shown in the appendix, the craft will be registered in the name of the purchaser and a Certificate of Registration and Airworthiness will be issued therefor, where the delivery was made at the factory or by air. Where the craft is delivered other than at the factory or by air under its own power the Certificate of Registration and Airworthiness will not be issued to the purchaser until after proof of ownership is made and the craft is inspected to determine whether it is assembled and is in the same general condition as when it was rated as airworthy in the hands of the manufacturer.

24. TERMINATION OF CERTIFICATE: The Certificate of Registration and Airworthiness will terminate if the craft is:
(A) Equipped with a type of engine different from that specified in the certificate;
(B) Operated at any time in excess of its authorized full load;
(C) Remodeled;

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(D) Flown more than 500 hours without the plane structure having been overhauled, except when an inspector of the Department of Commerce, after inspection certifies that the plane structure is airworthy;
(E) Flown with an engine used for more than 250 hours in flight without having been overhauled, except where an inspector of the Department of Commerce certifies that the engine is in proper condition;
(F) Seriously damaged, but a registered aircraft, after being seriously damaged, may be flown to its usual station for repairs but passengers for hire shall not be carried on such flights;
(G) Marked contrary to these regulations;
(H) Used in the violation of any of the laws of the United States.

25. SALE OR TRANSFER OF TITLE: If registered aircraft are sold, or title is transferred:
(A) To a person or corporation in which ownership the craft is not eligible to registration, the certificate of registration and airworthiness shall immediately terminate;
(B) To a person or corporation in whose ownership the craft is eligible to registration the certificate shall terminate within fourteen days after the sale or transfer of title.

26. DISPLAY AND SURRENDER OF CERTIFICATE: The Certificate of Registration and Airworthiness shall be carried in the craft whenever it is in service and shall be conspicuously posted where it may be readily seen by passengers or inspectors. Whenever the craft is found to be unairworthy the certificate shall be removed from the craft, and when the certificate is suspended or revoked, or when it is no longer in force, it shall be surrendered to the Secretary of Commerce. The certificate must be presented for inspection upon the demand of any passenger or of any authorized official or employee of the Department of Commerce.

27. REGULAR INSPECTIONS FOR AIRWORTHINESS: Each calendar day, immediately before a registered airplane is flown and also upon landing after the airplane has flown as much as ten hours since the last inspection, it shall be inspected by the certified pilot or mechanic to determine its airworthiness. If found unairworthy it shall not be operated until it is placed in an airworthy condition and certificate of such fact is duly made. If found airworthy such fact will be certified in the Inspection Report by the signature of the person making such inspection. The form of the report is shown in the appendix. The pilot shall be responsible for the airworthiness of the craft except where it is inspected by a certified mechanic and the pilot has no information that the craft is unairworhy. Inspection reports shall be retained by the registered owner for at least one year after execution, and shall be subject to inspection or delivery to the Secretary of Commerce upon his demand.

28. GOVERNMENT INSPECTIONS: Any authorized officer or employee of the Department of Commerce shall be permitted to inspect any registered aircraft to determine its airworthiness at any time and for such purposes he shall be given free and uninterrupted access to the craft and the field or shelter where the craft is located.

29. IDENTIFICATION MARKS FOR UNREGISTERED AIRCRAFT: Unregistered aircraft, except aircraft belonging to the Government of the United States, shall not fly in the navigable airspace of the United States without displaying an identification mark. The Secretary of Commerce will assign to such aircraft the proper identification marks, upon application, the form of which is shown in the appendix. The mark will consist of a number.

30. IDENTIFICATION MARKS FOR GOVERNMENT AIRCRAFT: Identification marks for aircraft belonging to the Government of the United States will be assigned marks in accordance with arrangements to be made with the affected departments.

31. MARKS FOR FOREIGN COMMERCE AIRCRAFT: Aircraft of the United States engaged in foreign commerce or flying over a foreign country shall bear the nationality mark, N, in addition to its identification mark. The N shall precede the identification mark and shall be a Roman capital letter of the same dimensions as the separate figures of the identification mark.

32. IDENTIFICATION MARKS FOR REGISTERED AIRCRAFT: Each registered aircraft shall bear an identification mark consisting of the registration number of the aircraft preceded by:
(A) The Roman capital letter C, (meaning Commercial) for craft engaged in the carriage of persons or property for hire, or in the furtherance of a business or navigation from one place to another for operation in the conduct of a business;
(B) The Roman capital letter M, (meaning mail) for craft engaged in the carriage of the mails, whether also engaged in carrying persons or property for hire, or otherwise;
(C) The Roman capital letter S, (meaning State) for craft used solely for governmental purposes and belonging to States, Territories, possessions or municipalities, and
(D) The Roman capital letter P, (meaning Private) for all other registered aircraft.

33. PLACES AND DIMENSIONS OF MARKS: All nationality and identification marks shall be painted in black on a white ground and shall be located as follows:
(A) *On airplanes:* On the lower surface of the left lower main plane, the top of the letters or figures to be toward the leading edge, the height to be one-half of the chord, with a minimum of twelve inches; and on each side of the fuselage, or portion corresponding to the fuselage, between the main and tail planes, the height of the letters or figures to be four-fifths of the greatest depth of the narrowest portion of the fuselage or portion corresponding to the fuselage, on which the marks are painted;
(B) *On airships:* On both sides near maximum cross section and on the lower undersurface of the nose,
(C) *On balloons:* Twice, near the maximum horizontal circumference, as far as possible from one another.

In all cases the width of the letters and figures shall be two-thirds of the height and the thickness shall be one-sixth of the height. The letters and figures shall be painted in plain black type and be uniform in shape and size. A space equal to one-half of the width of a letter shall be left between each figure or letter.

34. OTHER SYMBOLS AND MARKS: Aircraft shall not bear symbols, designs or marks which might be mistaken for the assigned nationality or identification marks or which modify, add to, or subtract from the assigned marks or which confuse them with any other marks, or impair the visibility of such assigned marks.

35. WING PAINTING OF SEAPLANES: The upper surface of the upper wings of all seaplanes shall, for the purpose of protection and identification, be painted yellow.

36. IDENTIFICATION PLATE: All aircraft, except aircraft belonging to the Government of the United States, shall carry affixed to the fuselage or car, in a prominent place, a metal identification plate, inscribed with the name and residence of the owner and the identification mark.

37. EMERGENCY CERTIFICATES: All aircraft which are eligible to registration under the Air Commerce Act, and for which applications for Certificates of Registration and Airworthiness have been filed prior to July 1, 1927, will be considered to have been registered and rated airworthy, under this emergency provision, as of the date of such applications. This provision shall be effective only to midnight of July 1, 1927, and shall not extend to craft found, after inspection, to be unairworthy by the Secretary of Commerce.

Chapter Three
CERTIFICATION OF PILOTS AND MECHANICS.

1. PILOTS AND MECHANICS—Law of: The Secretary of Commerce shall, by regulation— * * *
"Provide for the periodic examination and rating of airmen serving in connection with aircraft of the United States as to their qualifications for such service." (Sec. 3 (d))
"The term 'airmen' means any individual (including the person in command and any pilot, mechanic, or member of the crew) who engages in the navigation of aircraft while under way, and any individual who is in charge of the inspection, overhauling, or repairing of aircraft." (Sec. 9 (k))
"It shall be unlawful * * * to serve as an airman in connection with any aircraft registered as an aircraft of the United States * * * without an airman's certificate or in violation of the terms of any such certificate." (Sec. 11 (a) (4))
"Any person who violates any provision of subdivision (a) of this section * * * shall be subject to a civil penalty of $500." (Sec. 11 (b))

2. APPLICATION OF THE LAW: For the purpose of this chapter, a person in command of registered aircraft underway and the pilot of registered aircraft will be classed as pilots and the person who repairs or adjusts registered aircraft underway and the person in charge of the ground inspection, overhauling, or repairing of registered aircraft, will be classed as mechanics.

3. CLASSIFICATION OF PILOTS AND MECHANICS: Pilots of Registered Aircraft are classed as Private or Commercial, and Mechanics are classed as Engine Mechanics or Airplane Mechanics.

4. APPLICATION OF PILOTS AND MECHANICS: Candidates for Piots' and Mechanics' Certificates must file an application for the certificate with the Secretary of Commerce. The form of the application is shown in the appendix.

5. GENERAL QUALIFICATIONS FOR PRIVATE PILOTS: A candidate for a Private Pilot's Certificate must be
(a) A citizen of the United States;
(b) Over the age of eighteen years;
(c) Of good moral character;
(d) In sound physical and mental condition and free from physical defects, diseases and abnormalities which might affect his ability to fly aircraft, the character of such examinations being indicated by the questions contained in the Medical Certificate shown in the appendix.
(e) Skilled in the operation of aircraft;
(f) Versed in the air traffic rules, as required by the examination for that purpose.

6. GENERAL QUALIFICATIONS FOR COMMERCIAL PILOTS: A candidate for a Commercial Pilot's Certificate shall have the same qualifications as a Private Pilot, and also:
(A) Pass a practical and theoretical examination in:
1. Theory of flight.
2. Elementary:
(a) Meteorology;
(b) Engine Mechanics;
(c) Plane mechanics and rigging, and
(d) Electricity.
(B) have had at least 100 hours of solo flying, of which at least five hours, except in case of illness, must have been during the month immediately preceding the date of the filing of the candidate's application.

7 PILOTS' PHYSICAL EXAMINATIONS: Candidates for Pilots' Certifiates will be notified to appear for a physical examination before a physician designated or approved by the Secretary of Commerce. The fee for such examination, to be paid to the physician by the applicant, shall not exceed $5.00. The result of such examination will be certified by the physician to the Secretary of Commerce.

8. EXEMPTED CLASSES FOR COMMERCIAL PILOTS' CERTIFICATES: Upon the presentation of satisfactory documentary proof to the Secretary of Commerce, after application for the Pilot's Certificate has been filed, the following persons shall be exempt from the physical, mental and practical examinations and tests and shall be certificated as Commercial Pilots upon passing the examination of the Air Traffic Rules:
(A) Holders of (1) Airplane Pilot's ratings or certificates in the United States Army Air Corps, and (2) Naval Aviators' Certificates issued by the United States Navy or Marine Corps. Holders of both classes of certificates issued prior to January 1, 1925, to be eligible for such exemptions, must have been on regular duty in the service since the issuance of the certificates.
(C) Persons employed as Pilots by the Postoffice Department of the United States, and who have served at least six months as such pilots in the air transportation of the mail;
Provided, however, that the persons mentioned in sub-paragraphs A, B and C must have had at least an average of five hours of solo flying each month since the date of the issuance of their certificates or date they were employed as such air mail pilots. All of the exemptions specified in this section shall cease at midnight one year after these regulations take effect.

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8. QUALIFICATION OF ENGINE MECHANICS: To be certified as an Engine Mechanic, the candidate must have the following general qualifications:
   (A) A knowledge of internal combustion engines and power plants of airplane types, with particular reference to gasoline, carburetor, lubrication and cooling systems;
   (B) A knowledge of elementary electricity applied to airplane heating, lighting, ignition and communication, and
   (C) Be able to inspect, adjust, repair, overhaul and assemble airplane engines.

9. QUALIFICATION OF AIRPLANE MECHANICS: To be certified as an Airplane Mechanic, the candidate must have the following general qualifications:
   (A) Be versed in:
      1. the elements of theory of flight;
      2. plane structure, rigging and control;
      3. strength and properties of materials in airplane construction;
      4. be able to inspect, repair, overhaul and assemble airplane structures.

10. EXAMINATIONS FOR MECHANICS' CERTIFICATES: Practical and theoretical examinations will be given to candidates for mechanics' certificates. Certificates will be issued only where the candidates pass such examinations, with a grade of at least seventy per centum.

11. EXAMINATIONS, TIMES, PLACES AND FACILITIES: Applicants for Pilots' and Mechanics' certificates shall submit to the required examination and tests in accordance with notices given to them by the Secretary of Commerce. Such examinations and tests will be conducted by an examining officer of the Department of Commerce. Candidates for Pilots' certificates are required to furnish the aircraft in which the flight tests are to be made.

12. FLIGHT TESTS FOR COMMERCIAL PILOTS: To be certified as a Commercial Pilot the candidate must pass the following tests:
   (A) Glide from 2500 feet and land, in normal landing attitude, by wheels touching ground in front of and within 150 feet of a point designated by the examining officer. The engine shall idle from 2500 feet but the throttle may be used to clear the engine down to the 500 foot height;
   (B) Glide from 2500 feet and land, in normal landing attitude, by wheels touching ground in front of and within sixty feet of a point designated by the examining officer. The free use of the engine is optional.
   (C) Maneuver at 1000 feet around two posts or buoys fifteen hundred feet apart, making a series of five figure eight turns on a thirty degree bank;
   (D) Fly over a triangular or rectangular course at least 125 miles, landing at place of take-off within at least five hours. This flight shall also include two obligatory landings, not at point of departure, when craft must come to rest. The course will be designated and the candidate will be furnished with route information by the examining officer at time of departure and the examining officer will determine whether the course was correctly followed and whether the obligatory landings were satisfactory. Upon the presentation of satisfactory proof that the candidate has engaged in solo flight cross country a distance of at least 125 miles within one year preceding the date of his application, the flight specified in this subsection will be omitted.
   (E) Fly in emergency maneuvers, doing spirals, side slips and wing over eights and recovering from stalls;
   (F) Fly at night for thirty minutes over a course appropriate to night flying. Upon the presentation of satisfactory proof that the candidate has flown in night solo flights for at least thirty minutes during the year immediately preceding the filing of his application this test will be omitted.

13. FLIGHT TESTS FOR PRIVATE PILOTS: To be certified as a Private Pilot the candidate must pass the tests prescribed in Section 12 (A), (B) and (C) except the distance shall be 300 feet for flight A and 120 feet for flight B.

14. EXAMINATION ON AIR TRAFFIC RULES: All candidates for pilots' certificates, including the persons exempted from examinations under Section 8, shall be required to pass the tests on the air traffic rules, with a grade of at least seventy per centum.

15. CERTIFICATES, DURATION, RENEWALS AND CONDITION:
   (A) To candidates meeting the requirements of these regulations appropriate certificates will be issued. The forms of such certificates are shown in the appendix.
   (B) Unless sooner revoked, all pilots' certificates shall remain in force for six months, and mechanics' certificates for two years, after issuance;
   (C) The pilots' certificates will be renewed for additional six months periods upon proof that the holder's physical condition has not been impaired since the issuance of the last preceding certificate and the additional proof by the holder of a commercial pilot's certificate that he has had at least thirty hours of flying during the last six months, of which at least 10 hours, except in case of illness, must have been during the last preceding month.
   (D) The mechanic's certificate will be renewed upon proof that the holder has engaged in duties under his certificate for at least one-half of the term of the certificate, of which at least two months, except in case of illness, must have been during the last four months of such term.
   (E) All pilots' certificates will be issued on the condition that the holder will not carry passengers for hire in any unregistered aircraft and that a private pilot will not navigate aircraft in interstate or foreign air commerce.

16. PERSONAL POSSESSION OF PILOTS CERTIFICATE: The Pilot's Certificate shall be kept in his personal possession when he is navigating aircraft and must be presented for inspection upon the demand of any passenger or any authorized official or employee of the Department of Commerce.

17. EMERGENCY PROVISION: Persons who are required by the Air Commerce Act, or these regulations, to obtain Pilot's or Mechanic's certificate, and who file their application for such certificate, and are not examined prior to July 1, 1927, will be considered to have been certificated as such pilot or mechanic as of the date of the filing of such application. This provision shall have no effect on and after July 1, 1927, and persons considered certificated hereunder shall not be entitled to renewal privileges granted by these regulations unless they have been regularly certificated after such date.

Chapter Four.
CERTIFICATION OF AIR NAVIGATION FACILITIES.

1. LAW:
"The Secretary of Commerce shall by regulation:—Provide for the examination and rating of air navigation facilities available for the use of aircraft of the United States as to their suitability for such use." (Sec. 3 (d)).
"The term 'Air navigation facility' includes any airport, emergency landing field, light or other signal structure, radio directional finding facility, radio or other electrical communication facility, and any other structure or facility, used as an aid to air navigation." (Sec. 9 (1)).
"The term, 'airport' means any locality, either of water or land, which is adapted for the landing and taking-off of aircraft and which provides facilities for shelter, supply, and repair of aircraft, or a place used regularly for receiving or discharging passengers or cargo by air." (Sec. 9 (g)).
"The term 'emergency landing field' means any locality, either of water or land, which is adapted for the landing and taking-off of aircraft, is located along an airway, and is intermediate to airports connected by the airway, but which is not equipped with facilities for shelter, supply, and repair of aircraft and is not used regularly for the receipt or discharge of passengers or cargo by air." (Sec. 9 (h)).

2. APPLICATION AND CERTIFICATE: The Secretary of Commerce will rate all air navigation facilities as to their suitability for use of registered aircraft, if application is made. The form of such application is shown in the appendix. For facilities found by the Secretary of Commerce to be suitable for such use air navigation facility certificates will be issued for a term of six months, renewable for additional six months' periods upon application and finding by the Secretary of Commerce of continued suitability. If there is a material change of the facilities the certificate will terminate unless such change is approved by the Secretary of Commerce.

3. RATING OF FACILITIES FOUND SUITABLE: Facilities found to be suitable for use of registered aircraft will be graded, first, second or third class. Facilities which do not meet the minimum requirements set out in the regulations will not be certificated.

4. AIRPORT REQUIREMENTS: The minimum requirements for certified airports are as follows:
   (A) *Third Class:*
      1. A firm and approximately level field, well drained and without obstructions, high grass, or ditches more than five inches deep. The field must have suitable approaches and be large enough to allow a minimum of 100 feet of clearance between the edges of the field and the runways.
      2. Two clear runways, at angles between 45 and 90 degrees, at least 1800 feet long and 100 feet wide, graded to gradual rise at extreme ends and to be without shoulders, ridges or open ditches;
      3. Day marked and equipped with standard wind direction indicator.
      4. Equipped with facilities for supplying fuel, oil, water, shelter and minor repairs for aircraft;
      5. Provided with dependable telephone service to nearest city or town and with first aid medical supplies;
      6. Have in attendance ground personnel by day, and
      7. Red flags marking all places and objects.

The dimensions of the field and runways are based upon altitudes up to 2500 feet above sea level. Fields and runways at higher altitudes must be increased in size in accordance with information furnished, upon request, by the Secretary of Commerce:
   (B) *Second class:*
      1. The minimum requirements for third class airports, and
      2. Runways at least 2200 feet long and 150 feet wide;
      3. Runways of cinder, slag, asphalt or similar material;
      4. Lunch or restaurant facilities for airmen.
   (C) *First Class:*
      1. The minimum requirements for second class airports, and
      2. A clear unobstructed circular taking-off and landing area not less than 3000 feet in diameter, with gradient not exceeding one and one-half per cent and with all lines and wires underground;
      3. A growth of tough all year grass on field surfaces not covered by buildings, roads or runways, the grass to be kept trimmed below six inches in height;
      4. Buildings, fences and obstructions on the field painted so as to be plainly visible;
      5. Rest hut for airmen;
      6. Water and sewage systems and electrical facilities for lighting purposes, with chemical fire extinguishers for aircraft and hangars.
      7. Night marked according to these regulations, and equipped with an illuminated wind cone or illuminated T and adequate flood lights;
      8. Maintenance of ground personnel by day and night.

5. EMERGENCY LANDING FIELDS:—Rating of: Fields which the Secretary of Commerce finds to be suitable for emergency landing of aircraft, will be rated as Emergency Landing Fields, but the certificate will be revoked if the field is not maintained in a state suitable for the landing of aircraft without danger.

6. RATING OF OTHER AIR NAVIGATION FACILITIES: All other air navigation facilities will be rated as suitable for the use of aircraft of the United States when found to conform to standards of suitability designated by the Secretary of Commerce from time to time or equal to those facilities installed by the Secretary of Commerce on emergency landing fields or along airways maintained by the Secretary of Commerce.

BOEING AIRPLANE COMPANY

Manufacturers

of

Military and Commercial Aircraft

Seattle, Washington

7. DAY MARKS: All certified airports and landing fields must be marked by day with a plain white landing circle, one hundred feet in diameter, with a band four feet wide, placed flush in the center of the landing area.
8. NIGHT MARKS: All first class airports (and all other certified fields open at night) must be night marked as follows: The landing field outlined with white lights at least one hundred and fifty feet distant from each other. When desired, all lights may be extinguished excepting those on the corners of the field and one light on each line between the corners. The runways affording the least obstructed landings may be designated by green lights in the outlined lights of the landing field.
9. USE OF FACILITIES OWNED BY THE UNITED STATES: "Air navigation facilities owned or operated by the United States may be made available for public use under such conditions and to such extent as the head of the department or other independent establishments having jurisdiction thereof deems advisable and may by regulation prescribe." (Sec. 5 (c)).
10. FUEL, etc. AT COMMERCE DEPARTMENT FIELDS: "The head of any government department or other independent establishment having jurisdiction over any airport or emergency landing field owned or operated by the United States may provide for the sale to any aircraft of fuel, oil, equipment, and supplies, and the furnishing to it of mechanical service, temporary shelter, and other assistance under such regulations as the head of the department or establishment may prescribe, but only if such action is by reason of an emergency necessary to the continuance of such aircraft on its course to the nearest airport operated by private enterprise. All such articles shall be sold and such assistance furnished at the fair market value prevailing locally as ascertained by the head of such department or establishment." (Sec. 5 (d)).
11. FREE USE OF COMMERCE DEPARTMENT FACILITIES: Emergency landing fields, established and maintained by the Secretary of Commerce, shall be used only for emergency purposes, except by special order of the Secretary of Commerce. Such air navigation facilities of the Department as are made available for the public may be used without charge or discrimination.
12. LANDING FIELD REGISTERS: Certified airports and landing fields shall keep a register showing arrival and departure of aircraft, and such other information as is called for in the Register, the form of which is shown in the appendix.

Chapter Five
AIR TRAFFIC RULES.

1. *LAW:* "The Secretary of Commerce shall by regulation establish air traffic rules for the navigation, protection, and identification of aircraft including rules as to safe altitudes of flight and rules for the prevention of collisions between vessels and aircraft." (Air Commerce, Sec. 3 (e)).
2. APPLICATION OF THE LAW: "In order to protect and prevent undue burdens upon interstate and foreign air commerce the air traffic rules are to apply whether the aircraft is engaged in commerce or noncommercial, or in foreign, interstate, or intrastate navigation in the United States, and whether or not the aircraft is registered or is navigating in a civil airway." (Conference Report, Air Commerce Act of 1926.)
3. TAKE-OFF RULES: Airplanes shall take-off up-wind, when the natural conditions permit. On certified fields, and on all other fields where the dimensions permit it, the point at which the take-off is commenced shall be at least 1500 feet distant from the windward edge of the field. The take-off shall not be commenced until there is no risk of collision with landing aircraft and until preceding aircraft are clear of the field. A turn shall not be commenced over the field.
4. FLYING RULES:
   (A) *Right side traffic:* Aircraft flying in established civil airways, when it is safe and practicable, shall keep to the right side of such airways.
   (B) *Giving way—Order:* Craft shall give way to each other in the following order: (1) Airplanes, (2) Airships, and (3) Balloons, fixed or free. An airship not under control is classed as a free balloon. Aircraft required to give way shall keep a safe distance, having regard to the circumstances of the case.
   (C) *Giving Way—Duties:* If the circumstances permit, the craft which is required to give way shall avoid crossing ahead of the other. The other craft may maintain its course and speed but no engine-driven craft may pursue its course if it would come within 300 feet of another craft, 300 feet being the minimum distance within which aircraft, other than military aircraft of the United States engaged in military maneuvers, may come within proximity of each other in flight. When in consequence of thick weather or other causes, risk of collision cannot be prevented by giving way alone, each craft shall take such further action as will best avoid collision.
   (D) *Crossing:* When two engine-driven aircraft are on crossing courses the aircraft which has the other on its right side shall keep out of the way.
   (E) *Approaching:* When two engine-driven aircraft are approaching end on or nearly end on, as to involve risk of collision, each shall alter its course to the right, so that each may pass on the left side of the other. This rule does not apply to cases where aircraft will, if each keeps on its receptive course, pass more than 300 feet from each other.
   (F) *Overtaking:* (1) *Definition:* An overtaking aircraft is one coming upon another directly from behind or within seventy degrees from that position, and no subsequent alteration of the bearing between the two shall make the overtaking aircraft a crossing aircraft within the meaning of these rules, or relieve it of the duty of keeping clear of the overtaken craft until it is finally past and clear.
   (2) *Presumption:* In case of doubt as to whether it is forward or abaft such position it should assume that it is an overtaking aircraft and keep out of the way.
   (3) *Alternating Course:* The overtaking aircraft shall keep out of the way of the overtaken aircraft by altering its own course to the right, and not in the vertical plane.
   (G) *Height over congested area generally:* Except when taking-off or landing, no person shall fly aircraft over cities, towns, or settlements except at a height reasonably sufficient to make a safe landing outside of the city, town, or settlement, should the means of propulsion fail.
   (H) *Heavy weather flying:* In a cloud, fog, mist or other condition of bad visibility, aircraft shall proceed with caution, having careful regard to the existing circumstances.
   (I) *Acrobatic flying generally:* No person, intentionally, shall acrobatically fly any airplane;
      1. Over any city, town or settlement, or
      2. Without the approval of the Secretary of Commerce.
         (a) Over any established civil airway, or
         (b) Within a horizontal distance of 1000 feet from any certified landing field, or
         (c) Within 1000 feet of any other airplane in flight.
   (J) *Commercial acrobatic flying:* During flight from point to point, a registered commercial airplane shall not intentionally be flown acrobatically if it carries passengers for hire.
   (K) *Dropping objects:* Nothing which may endanger life or property shall be dropped from any aircraft, except when reasonably necessary to protect life.
   (L) *Seaplane Maneuvers:* Seaplane maneuvering on the water shall conform to the laws and regulations of the United States governing the navigation of water craft.
5. *LANDING RULES:*
   (M) *Upwind:* Landings shall be made up-wind.
   (N) *Course:* If practicable, when within 1000 feet of the leeward side of the landing field, the airplane shall maintain a direct course toward the landing zone.
   (O) *Right over ground plane:* The plane, in landing, has the right of way over planes on the ground, but in taxiing, as a part of the landing, the pilot of the landing plane shall exercise great caution to avoid the ground planes.
   (P) *Giving way:* When landing and maneuvering in preparation to land, the airplane at the greater height shall be responsible for avoiding the airplane at the lower height, and shall, as regards landing, observe the rules governing overtaking aircraft.
   (Q) *Distress landings:* An aircraft in distress shall in all circumstances be given free way in attempting to land.
6. LIGHTS:
   (R) The angular limits laid down in these rules, as shown by the sketch, will be determined when the aircraft is in a normal flying position on a rectilinear horizontal course.
   (S) *Lights when underway:* Between sunset and sunrise, airplanes underway shall show the following lights:
      (1) On the right side, a green light, and on the left side a red light, showing an unbroken light between two vertical planes whose dihedral angle is 110 degrees when measured to the right and left respectively from dead ahead, and to be visible at least three miles.
      (2) At the rear, and as far aft as possible, a white light shining reward, visible in a dihedral angle of 140 degrees bisected by a vertical plane through the line of flight, and visible at least three miles.

      The light rules for airships and balloons will be made by special regulations when the conditions require the same.
   (T) *Lights, when stationary:*
      (1) When on the surface of water and anchored or moored or out of control, aircraft shall carry one white light visible in all directions at least two miles.
      (2) Balloon mooring cables shall have groups of three white lights attached to them at intervals of 500 feet measured from the basket, and the object to which the balloon is moored shall have a series of groups of lights of the same kind to mark its position. By day the mooring cable shall carry in the same position tubular streamers marked with alternate bands of white and red.
7. SIGNALS:
   (U) *Distress:* The following signals, separately or together, shall be used in case of distress:
      (1) The international signal, SOS by radio;
      (2) The international code flag signal of distress, NC;
      (3) A square flag having either above or below it a ball, or anything resembling a ball;
      (4) A succession of white Very's pistol lights fired at short intervals.
   (V) *Signal for permission to land, and answer:* An airplane wishing to land at night at first class airports shall, before landing:
      (1) Fire a green Very's light, or
      (2) Flash a green light.

      Permission to land will be given by firing a green Very's light or flashing a green light. The firing of a red Very's light or the display of a red flare from the ground shall be taken as an instruction not to land.
   (W) *Signal when compelled to land:* When an aircraft is forced to land at night at a first class airport, if practicable, it shall signal its forced landing by firing a red Very's light or making a series of short flashes with its navigation lights.
   (X) *Prohibited area warnings:* A succession of red pennants by day or the discharge by night at ten second intervals of three projectiles, which on bursting show white stars shall constitute a warning that the zone is a prohibited area and a direction that the craft should change its course.
   (Y) *Fog Signals:* In fog, mist, or heavy weather an aircraft on the water in navigation lanes shall signal its presence by a sound device emitting a signal for about 5 seconds in two minute intervals.
8. *DEVIATION FROM AIR TRAFFIC RULES:* The air traffic rules may be deviated from when the special circumstances render a departure necessary to avoid immediate danger, or when such departure is required because of stress of weather conditions, or other unavoidable cause

MARTIN U.S.A.

TRADE MARK

The Star in the Sky

Whether on the wing of a mail plane, a bomber, a naval reconnaissance plane or a commercial carrier, the tri-color star of The Glenn L. Martin Company holds the same significance to the experienced observer—*engineering supremacy—fine workmanship and unremitting care—experience dating back to the infancy of the art seventeen years ago—DEPENDABILITY.*

POPULAR WRITERS are fond of comparing the airplane with the automobile and prophesying parallel developments. In one vital characteristic, however, there must always be a point of contrast. In its factors of safety the plane must always represent the greater responsibility to its makers. Margins established on a guess-and-hope basis have no place in flying. Experimenting should be monopolized by the maker—not left to his purchasers. As one man expressed it, "there are no cross-road garages a thousand feet up!"

With the primary facts of flying established and mastered, the task of the engineer and manufacturer is radically changed. The goal is now maximum dependability. The study, the research, the experiment is today centered on the perfection of detail.

In this second stage of progress, the Glenn L. Martin organization is re-proving the same vision, the same painstaking research and the same creative capacity that enabled it to maintain its leadership throughout the first seventeen years of its contributions to the art of aviation. Its shops, its laboratories and its flying field continue to be the center of unremitting progress.

THE GLENN L. MARTIN COMPANY

CLEVELAND, OHIO

Chapter Six.
SUSPENSION AND REVOCATION OF CERTIFCATES

1. LAW OF CERTIFICATES:
"The Secretary of Commerce shall by regulation—provide for the issuance and expiration, and for the suspension and revocation, of registration, aircraft, and airman certificates, and such other certificates as the Secretary of Commerce deems necessary in administering the functions vested in him under this act. Within 20 days after notice that application for any certificate is denied or that a certificate is suspended or revoked, the applicant or holder may file a written request with the Secretary of Commerce for a public hearing thereon. The Secretary upon receipt of the request shall forthwith (1) arrange for a public hearing to be held within 20 days after such receipt in such place as the Secretary deems most practicable and convenient in view of the place of residence of the applicant or holder and the place where evidence bearing on the cause for the denial, suspension, or revocation is most readily obtainable, and (2) give the applicant or holder at least ten days' notice of the hearing, unless an earlier hearing is consented to by him. Notice under this subdivision may be served personally upon the applicant or holder or sent him by registered mail. The Secretary, or any officer or employee of the Department of Commerce designated by him in writing for the purpose, may hold any such hearing and for the purpose thereof administer oaths, examine witnesses, and issue subpoenas for the attendance and testimony of witnesses, or the production of books, papers, documents, and other evidence, or the taking of depositions before any designated individual competent to administer oaths. Witnesses summoned or whose depositions are taken shall receive the same fees and mileage as witnesses in courts of the United States. All evidence taken at the hearing shall be recorded and forwarded to the Secretary for decision in the matter to be rendered not later than ten days after completion of the hearing. The decision of the Secretary, if in accordance with law, shall be final. The denial, suspension, or revocation shall be invalid unless opportunity for hearing is afforded, notice served or sent, and decision rendered within the respective times prescribed by this subdivision." Sec. 3 (f)
2. GROUNDS FOR SUSPENSION OR REVOCATION: The following will be considered sufficient grounds for the suspension or revocation of certificates:
   1. Violation of the act or any regulation made thereunder or of any of the terms or conditions of the certificate;
   2. Carelessness or inattention to duty;
   3. Incompetency, drunkenness or personal possession of intoxicating liquor while on duty;
   4. Use of morphine, cocaine or other habit-forming drug having a similar effect;
   5. Failure or refusal to make proper and seasonable reports;
   6. Refusal to exhibit certificate upon proper demand;
   7. Wilfully making any false report, and
   8. Making false statements in any application under the act of regulations. In addition, air pilots' certificates may be suspended or revoked for any violation of the Air Traffic Rules.

Chapter Seven.
REPORTS

1. QUARTERLY NAVIGATION REPORT: The owner of registered aircraft shall quarterly transmit to the Secretary of Commerce a navigation report. The form of the report is shown in the appendix.
2. ACCIDENT REPORTS: All accidents in which registered aircraft of the United States are involved shall immediately be reported by the registered owner to the Secretary of Commerce on the form of which a copy is shown in the appendix. Accidents in which loss of life occurs shall also be immediately reported by telegraph or telephone to the Secretary of Commerce, in which report shall be given the essential facts concerning the accident.
3. REPAIRS AFTER ACCIDENT REPORTS: After repairs have been made on an aircraft seriously damaged or involved in a serious accident, the registered owner shall make full report to the Secretary of Commerce of the kind and extent of repairs made to the craft.

Chapter Eight.
EFFECTIVE TIME OF REGULATIONS.

1. TIME OF TAKING EFFECT: These regulations shall take effect at midnight of the ———— day of ————, 1927. Copies of these regulations may be obtained upon request made to the Secretary of Commerce, Washington, D. C.

Pressure Distribution on C-7 Airship

An investigation made by the National Advisory Committee for Aeronautics, at the request of the Bureau of Aeronautics, Navy Dept., for the purpose of determining the aerodynamic pressure distribution on a "C" class arishp in flight, is the subject of N.A.C.A. Report 223, prepared by J. W. Crowley Jr., and S. J. De France. The investigation was conducted in two parts, (a) tests on the wall surfaces in which the pressures at 201 points were measured and (b) tests on the envelope in which 190 points were used, both tests being made under as nearly identical flight conditions as possible, so that the results could be combined and the pressure distribution over the entire airship obtained.

The method of testing consisted of measuring the pressures by means of orifices located at the desired points connected to the tubes of a multiple liquid manometer. Simultaneous readings of all the pressures were obtained by photographing the manometer.

The results as presented in this report are mainly in tabular form and may be briefly summarized as follows:

(1) The maximum local pressure encountered on a tail surface was 7.3 lb./sq. ft.

(2) The maximum total normal force on a complete tail surface was 352 pounds or a CNF of 0.316 occurring on the bottom fin and rudder during a reversal of the rudder.

(3) The maximum moment of the tail surface forces about the center of buoyancy was 37,200 lb. ft.

(4) The investigation of the envelope pressures, while showing the general distribution of pressure satisfactorily, is practically useless in the determination of total aerodynamic forces on the airship.

(5) It is concluded that the pressures set up by a bump are larger than those obtained in maneuvering.

A copy of this report may be obtained upon request from the National Advisory Committee for Aeronautics, Washing- D. C.

Varney Aircraft Company Booklet

AVIATION has just received from the Varney Aircraft Co., Peoria, Ill., a copy of a forty page booklet entitled "Peoria In The Air". The cover is in three colors and numerous types of planes are illustrated. The booklet contains interesting short articles aimed to bring home to the public the advantage of flying.

The publishers are the Varney Co., which has turned out a most creditable piece of aviation educational literature. Other communities which hope to be centers of flying activities might well follow the example of Peoria, Ill., in bringing the advantages of flight to the attention of their own citizens in this attractive and effective way.

Gorrell Studies Commercial Flying

Announcement has been made of the appointment of E. S. Gorrell, vice-president of the Stutz Motor Car Co. of America, Indianapolis, Ind., as a member of a special committee of the Chamber of Commerce of the United States of America, whose headquarters are in Washington, D.C., for the purpose of making a study of the aeronautic situation with a view to furthering the development of civil and commercial aeronautics in this country.

E. S. Gorrell

Mr. Gorrell is one of the early fliers in the United States, taking up flying in the year 1914. He was a flier during the Mexican Punitive Expedition, which resulted from Villa's raid on the United States in 1916.

During the World War he was the aeronautical engineer in charge of aeronautical engineering of the American Expeditionary Forces in Europe, and was later Chief of Staff of the Air Forces. He represented America in the years 1917, 1918 and 1919, in several hundred international conferences on aeronautics, and was a member of the committee, representing twenty-three nations, that drew up the international convention report on aeronautic investigation.

The Voice of The Sky

At the National Air Races at Model Farms Field, Philadelphia, the greatest innovation of the year in aeronautics was presented to the public for the first time.

A singing and talking airplane, flew at 3000 to 5000 feet sending forth voices and music, which could be heard by people on the ground without the use of any radio receiving set or any other artificial means. This has never been done before.

Spectators at the National Air Races had keen enjoyment and pleasure at the new form of entertainment. The sensation of listening in on the first aerial concert ever given, made a deep impression on the crowd.

The demonstration was given by the Plane-Speaker Corporation of Philadelphia, and marked the first official and public test of "The Voice of the Sky" and brings to a successful conclusion several years of extensive research and costly experimentation made under difficulties and problems that heretofore have remained unsolved.

Charles Lawrance, president of the Wright Aeronautical Corporation is president of the new company.

Through the assistance of Mr. Lawrance and with the association of Charles Townsend Ludington, President of the B.B.T. Corporation of America and Harold F. Pitcairn, President of the Pitcairn Aviation Company of Philadelphia, and Capt. Manvel H. Davis of Kansas City, Mo., development of the voice of the sky apparatus has been accomplished rapidly. "The Voice of the Sky" talks, sings and renders all form of music desired in clear, well-modulated tones, every syllable and every note being so clearly projected as to be heard distinctly by those below.

"The Voice of the Sky" is almost superhuman. For the first time in history the human voice and other sounds can be so powerfully amplified and the purity of tone so well preserved that messages and programs are transmitted and projected earthward from a twin-engine plane in full flight at altitudes ranging from one thousand feet to a mile high.

The apparatus required to operate "The Voice of the Sky" was especially constructed. Entirely new adaptions of electrical energy, new mechanisms and most delicate electrical devices are built in the ingenious Plane-Speaker assembly. The Plane-Speaker apparatus is installed in a Sikorsky S-29 which is equipped with twin Liberty engines. The apparatus practically fills the big cabin and weighs approximately half a ton. In addition to the pilot and mechanic, two persons are required to operate the Plane-Speaker.

The first official demonstration of "The Voice of the Sky" to the public was made with Capt. R. W. Mackie at the microphone, George W. McCauley at the control board and Capt. C.B.D. Collyer at the stick, as pilot.

The inventors of the Plane-Speaker apparatus, Bernard Knapp, J. M. Coburn, George W. McCauley and R. W. Mackie, are all former Army aviators. McCauley and Mackie started working on the amplifying apparatus several years ago. They attained remarkable success and startled the airmen of Ellington Field, Texas, with their first test demonstration. Coming from behind the clouds singing "The Rosary" they broke into view introducing themselves and announcing their device to the Army officers below. Upon landing they were besieged with questions and wondering looks accompanied with the congratulations of everyone on the field.

At about the same time, Knapp and Coburn were making their improved test demonstration before a selected audience at Kansas City, Mo., and among which was Lou E. Holland, then president of the Associated Advertising Club of the World. The result of their demonstration was so remarkable that later while presiding at the International Convention of Advertising Clubs at Philadelphia in June, Mr. Holland took occasion to bring the matter to the attention of Charles Townsend Ludington of Philadelphia, with the result that through Manvel H. Davis of Kansas City, Mo., who was instrumental in bringing the Houston and Kansas City inventors together, the new organization was formed, including Messrs. Lawrance, Ludington and Pitcairn.

This new organization, through the co-ordinated efforts of the inventors and with the aid of several technical experts of national note, reconstructed and rebuilt the apparatus, increased its power, clarity and scope and brought it to such perfection that today it is termed a new wonder of the world.

Concerts from the sky, songs, piano and other instrumental selections, special announcements, etc., over cities are being planned for "The Voice of the Sky" by the Plane-Speaker operators. Never before has it been considered possible for such demonstrations. Never before has it been possible to project the human voice or music from the air without both sending and receiving radio apparatus.

Plans are being developed by the Plane-Speaker Corporation to place several multi-engined planes into service, equipped with plane-speaker apparatus. These planes will be flown to various important centers of the country and made available for educational, news, entertainment and commercial purposes. They will also be prepared to serve government authorities should occasion arise for quickly and effectively reaching masses of people.

Mr. Lawrance, President of the Plane-Speaker Corporation, advises that all manufacturing and aerial operations of the company will be directed from the general offices of the Company at 816 Atlantic Building, Philadelphia. Demonstrations will be given from time to time as tests are made on newly designed framework adapted to the various types of airplanes in which the plane-speaker apparatus is being installed. The Plane-Speaker Corporation plans to serve the nation-wide public in such a manner as to meet with popular approval and a warm welcome of appreciation from every city in the country.

The advertising value of the plane-speaker device must, undoubtedly be very great and it may be anticipated that its possibilities will be turned in this direction. There is little doubt that it will form a stern competitor of the already existing forms of aerial advertising.

Weather Service to Civil Flying

Twenty-one new pilot balloon stations will be established along the civil airways of the Weather Bureau of the Department of Agriculture in order to aid air navigation.

The establishment of these stations was provided for in the deficiency bill just passed by Congress.

The pilot balloons which will be sent up along the air routes give conditions of the air currents and provide information whereby the air pilot can know what the weather conditions will be over his route four to six hours in advance.

If a pilot is to leave at 2 o'clock for a four-hour flight, a general forecast issued at 8 a. m. is of little use to him. What experience has shown that he needs is information at 1:45 p. m. as to conditions then prevailing, and a prediction, based upon these conditions, for the next five hours.

This means, of course, that observations will not be taken simultaneously at all points along an airway, but at varying times depending upon the aviation schedules. Special observations will be required of surface and low level conditions, such as visibility, fog, squalls, thunderstorms and other unfavorable phenomena. Wind direction and velocity and heights of clouds will be furnished.

The stations will be as follows: Chicago, Cheyenne, Salt Lake City, Cleveland, Reno, New York, Dallas, Minneapolis, Kansas City, St. Louis, Jacksonville, San Francisco, Seattle, Los Angeles, Detroit, Boston, Miami, Atlanta, Portland, Ore., Oklahoma City, Cincinnati.

The first 10 will probably be in operation within a month or two, and the others, depending on the success of the Weather Bureau in procuring suitable equipment, it is hoped will be in operation by November. Eight of these stations are located along the transcontinental line, the remainder on the contract lines.

Side Slips

By ROBERT R. OSBORN
Further Reports of The National Air Races, by Side Slips' Special Correspondent

Well, Sir, I and the flivver finely arrived at the National Air Races and it was very good. That is, the races was good, but the place where they was held was called "Model Farms" and they must have used the part what is the cow yard or the pig pen in normal times. They was lakes all over the field, one of the finest being in front of the press box, where the newspaper boys got in some fishing during the dull moments. They did have lots of trouble though, with the ducks from the farm stealing their bait off their hooks before they could get it into the water. The field being wet accounted for one of the sadest affairs during one day, when one of the fliers mistook a pile-driver being towed up the Delaware for a pylon and lose the race thereby. The fear was expressed by the officials that an unusually high tide might cause the complete postponement of the races but fortunately the dikes and levees held. I was unlucky in not selecting a good mooring for the flivver, though, and it drifted a couple of miles downstream during one day.

They was a lot of fellows I knew there, but I did not recognize them for a couple of days on account they had been on parties for six or seven nights and was pretty well worn out. From the reports, I heard the wetness of the field was nothing compared to some of these Philadelphia hotels and I must say some of the boys looked like they had been shanghaied for Dempsey's sparring partners. Most of them did not seem to know whether there was an air race on or whether they was attending an Elks convention and most of them had to leave their addresses at the timer's stand so that the results of the races could be mailed to their home.

You could tell you was in Philadelphia even if you had not seen the station sign, when the announcer fell asleep a couple times each day in between his announcements. You remember a few months ago there was some criticism about holding the races here on account Philadelphia being such a slow town, and also maybe the racers being held up by the Japanese Beetle inspectors over in Jersey, but the only sleepy ones I seen were the out-of-town boys what had been on these parties.

Great speed was attained in the free-for-all pursuit race, of which Lieutenant Cuddihy was exclaimed the winner. His plane made 180.495 m.p.h. which was a great surprise to me, I not expecting him to go a bit faster than 180.492 m.p.h. Nobody seems to know yet how the speeds was obtained for the races as most of the timers seemed to be at the hot-dog stand all afternoon. Usually they was one timer around, though, and he seemed to run each race something on the order of a best-ball golf match.

Among the features for the show was the arrival and landing of the Los Angeles, and out of fairness to the Army and Navy it must be said that the Marines detailed to keep the ship on the ground did not "have the situation well in hand" most of the time. Just as the ship was going to go down in one of the puddles for the third time, they lost their hold an off she went back to Lakehurst. Miss Ederle was also on hand, which I understand she is quite a swimmer, but you can realize how bad conditions was on the field when she refuse to leave the grandstand without a life preserver.

One of Mr. Sikorsky's flying hotels was present and give an exhibition of loud-speaking from the air. This did not bother us much, though, as you couldn't hear any more than you can hear at the average banquet, on account all the people around cracking peanuts between their teeth and the boys selling programs of today's races, with name an number of every player.

In conclusions, and all joking to one side, I must admit this was one of the best air races even I has attended. It is hoped that this frank admission on my part will spur the managers of next year's show to still greater efforts.

Y'rs. V'y. Tr'ly.
The Intrepid Aviator

PROPOSALS FOR NAVY TRAINING PLANES

1. In order to encourage the development of aviation and to improve the efficiency of naval aeronautical material, as contemplated by Act of Congress, Public No. 446, approved July 2, 1926, the submission of bids is hereby invited for training planes, convertible land or seaplane type, combined primary and gunnery training, in accordance with designs submitted by the bidder competitively.

2. Each design will be accompanied by a graduated scale of prices for which the designer is willing to construct any or all of the aircraft in lots of one (1), three (3), ten (10), twenty-five (25), fifty (50), seventy-five (75) and one hundred (100), and also a price for which the design in whole or in part will be sold to the Government.

3. All bids with accompanying designs will be submitted to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., and must be placed in the mail not later than December 10, 1926. No bids or designs mailed thereafter will be considered. Schedules giving detailed information as to the conditions and requirements of the competition and as to the various features and characteristics to be developed, listing specifically the respective measures of merit, will be supplied upon application to the

BUREAU OF SUPPLIES AND ACCOUNTS
Navy Department, Washington, D. C.
CHARLES MORRIS
Paymaster General of the Navy

Alexander Eaglerock

(PERFORMANCE WITH ECONOMY)

is a

MONEY MAKER

C. E. Steele, Eaglerock owner writes:

"From the time I left Denver, August 11 until August 27, I took in a little over $1100.00, averaging about four hours flying per day."

WE SELL THE EAGLEROCK ON A

TIME PAYMENT PLAN

draw your own conclusions

DETAILS OF PLAN ON REQUEST

EAGLEROCK DEALERS

Southern California—Aero Corporation of California, Los Angeles
Northern California—W. L. Lamkin, Porterville, California
Michigan—Niles Airways, Niles, Michigan
Indiana—Captain J. A. Yonge, Gary, Indiana
Illinois—Sievert Aircraft Corp., Chicago
Oklahoma and Texas Panhandle—P. R. Braniff, Oklahoma City.
Virginia and No. Carolina—J. S. Charles, Richmond, Va.

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AIRPORTS AND AIRWAYS

Portland, Ore.

The Rankin Flying Service, of Portland, Ore., which was incorporated in May, to do general air service business, have leased a field on the East bank of the Wilamette River, North of the Broadway Bridge and East of Swan Island. The field is approximately 1,800 x 800 ft.

Swan Island is being filled and raised 18 ft., and being made suitable for either land or water planes. The Port Commission, which is doing the work, hopes to make this one of the finest airports in the West. The present plans call for a fill 5,000 ft. long and 1,000 ft. wide, with perhaps a fill across the east channel of the Willamette of 3,000 by 1,000 ft., giving a field 5,000 ft. north and south with the prevailing winds, and 3,000 ft. East and West, each by 1,000 ft. wide.

The Rankin Flying Service has undertaken the distribution of the Waco planes for the Northwest and have a carload moving to be used in air taxi service and passenger carrying on the field. The taxi service will operate at all points within reach of Portland by plane. Twelve students graduated from the school this summer, under the instruction of Tex Rankin, and a large class has registered for fall work.

Alaska Mapping Nears Completion

The Interior Department received a radio message on Sept. 11, announcing that the season's aerial photographic mapping program, which has been carried on in Alaska by the Navy Department in cooperation with the Interior Department, is nearing successful completion. The Department reported that this communication, sent to the Geological Survey of the Department, stated that the Navy fliers will leave Juneau Sept. 11 for Seattle, photographing areas along the route and reaching Seattle in about ten days. The announcement added:

The Navy fliers have photographed large areas in southeastern Alaska, including many of the important islands of the Alexander archipelago. Valuable results are reported to have been secured for the various Government bureaus requiring maps of this portion of Alaska.

Air Service Lieutenants

The largest number of the 143 newly appointed second lieutenants who were recently called into service from the Army ranks and from civil life have been assigned to the Air Corps, with the infantry second, the Department of War announced on Sept. 10. The full text of the official announcement is as follows:

The 143 new Army second lieutenants appointed from enlisted men of the Regular Army and civilians will be assigned to branches of the services as follows: Air Corps, 59; Infantry, 40; Field Artillery, 16; Coast Artillery Corps, 12; Cavalry, 10; Corps of Engineers, 5; Signal Corps, 1.

Altanta, Ga.

Postmaster General has designated Sept. 15 as the date when service will be inaugurated on the extension to Atlanta of the Miami-Jacksonville contract air mail route. A letter has been dispatched to Major Reed Chambers, president of

Light your Airport

With commercial aviation demanding 24-hour-a-day operation of airports, it is necessary that you light yours for night flying. A G-E Beacon will guide fliers to your airport at night, and G-E Boundary and Field Lights will make landing by night as easy and safe as by day.

For information address the G-E Aviation Lighting Specialist at Schenectady or at your local G-E Sales Office.

Lighting Equipment for Airports and Airways
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Field Lights
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GENERAL ELECTRIC

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7-26-26

the Florida Airways Corporation, contractor on the route, advising him of the date and authorizing a stop at Macon, Georgia. Macon was not on the original schedule.

Service from Miami to Jacksonville was inaugurated April 1, 1926, under a contract calling for the entire distance from Miami to Atlanta, but with an earlier start on the southern leg. No connections are made with other mail routes.

The schedule for the entire route, an air line distance of 683 mi., calls for a plane to leave Atlanta daily at 7. a. m.; Macon, 8:05 a. m.; Jacksonville, 11:10 a. m.; Tampa, 1:30 p. m.; Fort Myers, 3 p. m.; and to arrive at Miami at 4:45 p m. Northbound planes will leave Miami at 7 a. m.; Fort Myers, 8:55 a m.; Tampa, 10:25 a. m.; Jacksonville, 12:45 p. m.; Macon, 3:50 p. m.; and arrive at Atlanta at 4:45 p. m.

Omaha, Neb.

Pilot L. L. Bowen had an unusual experience Sunday morning which he would not care to repeat. He left Omaha in Douglas 612, with the New York twenty-first, at 12:48 A. M. on August 22nd. There was a severe electrical storm aproaching from the northwest at the time of departure. Bowen went south of this storm but encounted another before reaching Valparaiso. Visibility was poor, with not over fifty foot ceiling. He intended to set in at Valparaiso but after circling the field with wing lights on discovered the field was covered with water and rather than take a chance on nosing the ship over because of field being soft he decided to return to Omaha.

The two electrical storms had met and because of poor visibility he lost his way, but after flying for several minutes he discovered the light at Gretna, which he circled several times, but could not find a suitable place to land. However, he did recognize a road leading toward Lincoln, which he attempted to follow until he came to the Burlington tracks, which would lead him in to Omaha. While following the road he evidently went through a cut, as he scraped the left wing light on the ground just enough to break the lens and fill the streamlining with mud and weeds.

Upon feeling the wing touch he pulled the ship up into the low clouds and again became lost, but after a short time located the Burlington tracks and came into Omaha, landing on our field at 2:10 A. M.

Bowen states that his air speed was registering 130 miles per hour at the time the wing light touched the ground. This is considered a very narrow escape. Had he been eight inches closer to the ground the wing would have caught, and at the rate of speed at which he was traveling it would have probably been one of those cases in which we would never have known just what happened.

Kansas City, Mo.

Forty thousand miles of air travel is the record claimed by Mrs. Edward G. Bern, wife of the manager of the Bern Air Service, operating on the North Kansas City Field, and Mrs. Roy French, wife of one of the pilots. They accompanied their husbands last winter and spring on the advertising campaign conducted by the Bern Air Service for the Laredo, Tex., Chamber of Commerce.

Jake's Airport

By Jake Bertram

Vincent Cavisino, of Bismark, together with his mechanic, landed on our field on Saturday noon Sept. 4 to visit us, remaining long enough to gas up and feed up. He left for Leeds and Harvey, N.D., to fill several dates. Cavisino is flying a 150 Hisso Standard.

On Sunday noon, Lieut. Chet Jacobsen, ex-service pilot, arrived from Minot, N. D., and landed on our field with his Canuck for a visit. In taking off the field, his engine stopped, after he had gone about 25 ft. He tried to crow-hop over a fence, striking his left wing on the fence post. This swung him around and in landing sidewise his right wheel caved in, breaking the propeller and slightly damaging the left wing. No one was injured. He rolled his plane up to our hangar and in a few days had her in the air again.

On Monday, Sept. 6, Bill Leach, our local garage man, was seen approaching in a Canuck, piloted by Harris of our airport. Leach had traded his Cadillac car for the Canuck.

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Come and take your pick.

New Clipped wing Standards with used OX5 motors installed	$800.00
New Clipped wing Standards with Government overhauled OX5 motors installed	900.00
New Clipped wing Standards with new OX5 motors installed	1200.00
New Clipped wing Standards with 150 H.P. Hisso motors installed	1500.00
New Regular size Standard J.I. Airplanes with Govt overhauled OX5 motors installed	900.00
New Regular size Standard J.I. Airplanes with new OX5 motors installed	1200.00
New Regular size Standard J.I. Airplanes with 150 H.P. Hisso motors installed	1500.00
Used Standard J.I. Airplanes	$650.00 to $750.00
Reconditioned JN4D airplane, practically new OX5 motor installed	650.00

Our warehouses are full of Standard airplanes and parts, as well as parts for every make of plane and motor.

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LAMBERT-ST. LOUIS FLYING FIELD, ANGLUM, MO.

Jake's Airport is getting to be a very popular landing place, and we invite all passersby to land on our field and make themselves at home. We are on the map in North Dakota.

Billie Leach took the OX5 out of his Canuck this week to give it a thorough house-cleaning.

Henry C. Mustin Field Dedicated

The flying field at the Philadelphia Navy Yard, which has been named in honor of the late Captain Henry C. Mustin, was dedicated Sept. 17. The program was opened with short speeches by Rear Admiral T. P. Magruder, and eulogies of Captain Mustin's work as a pioneer in aviation were delivered by Rear Admiral A. T. Mayor, Rear Admiral W. A. Moffatt, Captain W. C. Westervelt and Captain W. H. Littlefield.

Assistant Secretary of the Navy, Theodore Robinson, introduced Captain Mustin's three sons to the audience and assisted them in the ceremony of releasing three carrier pigeons with messages for Army flying posts in various parts of the country and the Army, Navy, Commerce and Post Office Departments at Washington.

As Assistant Secretary Robinson prepared to leave the field in a plane, piloted by Lieutenant George T. Cuddihy, the plane of Lieutenant Eugene C. Batten took off and ascended 3,000 ft., and with smoke pouring from the exhausts, spelled the name "Mustin Flying Field". Numerous other planes had ascended also and a shower of flowers fell to the field, covering the monument which has been dedicated to Captain Mustin.

A flying circus was then held, the planes engaging in mimic combat and stunts, a frame shack, which had been erected on the field, being demolished in a bombing demonstration.

Captain Mustin was one of the Navy's first fliers. He began his aviation activities in 1912, was in command of the Vera Cruz in 1914 and in 1915 piloted the first airplane launched from a catapult aboard ship. He was Assistant Chief of the Bureau of Aeronautics at the time of his death.

Atlanta-to-Miami Air Service Inaugurated

On Sept. 15 the first air connection between two southern states was completed when two planes of the Florida Airways brought consignments of north and southbound mail to Atlanta and Miami.

Early in the afternoon the first northbound air liner was christened "Miss Atlanta" at Candler Field by Miss Elizabeth Bucanan. Henderson Holman, a pioneer airport advocate, who acted as master of ceremonies, presented Messrs. Large, Ross and Chenea, the latter vice president of the Florida Airways, who made the initial flight, and L. S. Flo, who piloted the first plane.

Attorney General George M. Napier, representing Governor Walker, Mayor Pro Tem Buchanan, Captain George M. Hope and Alderman W. B. Hartsfield gave brief addresses of welcome.

Thirty planes took off after the speeches. They comprised two army squadrons and various commercial planes. The army planes maneuvered for the spectators, while the commercial planes took passengers for flights.

After the celebration the Chamber of Commerce of Atlanta entertained the visiting airmen at the Ansley Hotel.

Berlin, Germany

Lufthansa, the company that operates the 75 airplane routes in Germany, insures each person taking passage for $6,000. So safe is air travel considered in Germany, that the insurance companies writing the policies charge the usual accident rate, without the usual extra charge for hazardous occupations. Official statistics show a percentage of safety in airplane flights for 1925 of 99.997. Thus far for 1926 there have been no accidents.

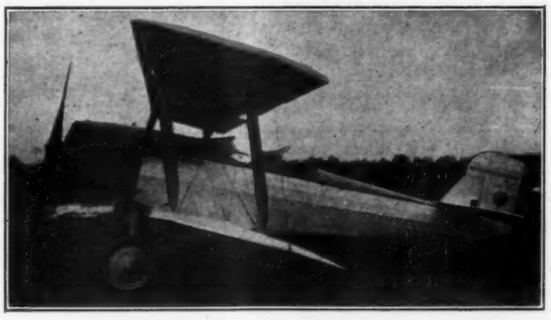
With a new type of Albatross airplane, equipped with two motors, 260 hp. each, and eight leather passenger chairs,

=ANNOUNCING=

The New Woodson Mail and Sport Plane.

Divided axle with eight foot tread.

Adjustable stabilizer and vertical fin.



Steel tube fuselage and steel tail group.

Excellent visibility.

Woodson Sport fitted with Wright E-4.

Carries a pay load of 800 pounds and seats 5 people.

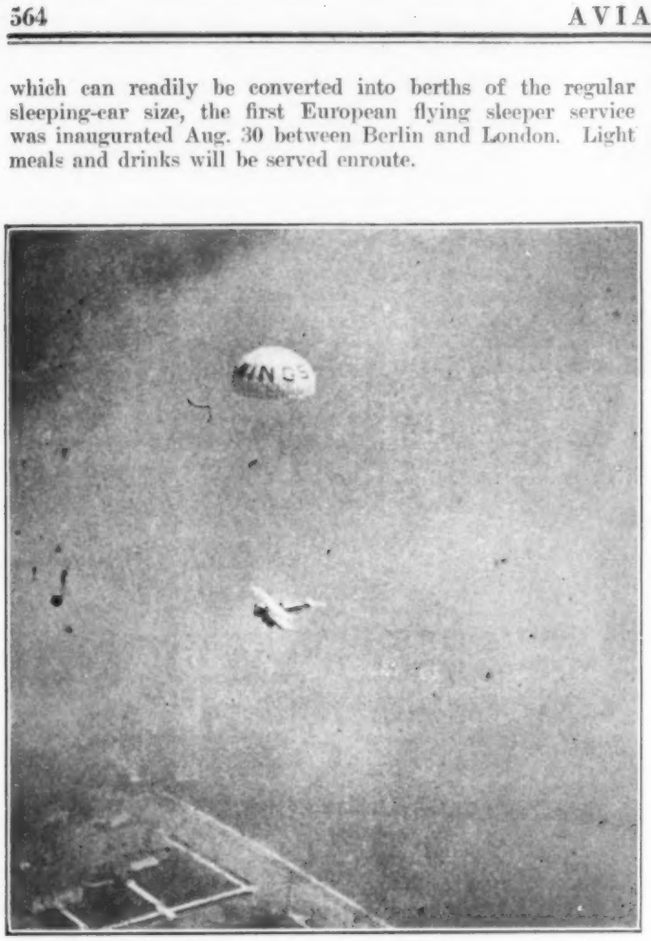
A change can be made to any of the following motors in 45 minutes: Salmson, Hisso, Wright J-4, Curtiss K or C-6, OX-5 or Liberty six. The power plant comes off as one unit, with radiator, oil tank, etc., attached to the mount.

Performance.

With Salmson,		With 180 Hisso,	
Maximum speed	135 M.P.H.	Maximum speed	125 M.P.H.
Minimum speed	45 M.P.H.	Minimum speed	40 M.P.H.
Pay load	800 lbs.	Pay load	700 lbs.
With Wright J-4,		With OX-5,	
Maximum speed	130 M.P.H.	Maximum speed	90 M.P.H.
Minimum speed	42 M.P.H.	Minimum speed	38 M.P.H.
Pay load	800 lbs.	Pay load	350 lbs.

WOODSON ENGINEERING COMPANY
BRYAN, OHIO

which can readily be converted into berths of the regular sleeping-car size, the first European flying sleeper service was inaugurated Aug. 30 between Berlin and London. Light meals and drinks will be served enroute.



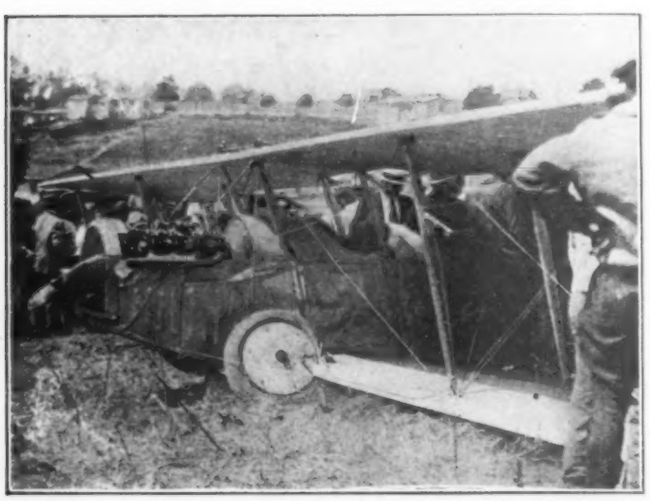
The Jenny coming down by parachute

Parachute Lands Plane

A test made at Los Angeles recently resulted in a giant parachute bringing a plane and pilot safely to earth from an altitude of 2,500 ft.

Upon reaching the desired altitude, R. Carl Oelze, of the Naval Reserve, who piloted the plane, a Jenny, stopped his engine and released the parachute. The plane landed three and a half miles West of the starting place and required I min. 6 sec. for the descent, approximately 38 ft. per sec. The pilot and plane weighed 1,800 lb.

The test was witnessed by 25,000 people and a dozen planes circled around Oelze's machine carrying photographers.



After the landing; the extent of the damage will be seen from this photograph.

Lieut. Doolittle, with Lap Pack type; Lieut. Brookley, with Seat Pack type — IRVIN Air Chutes.

In the Service of U. S. A.

They think nothing about it now. These men of the Army Air Service. They step easily into their "IRVIN" harness before going up. And then as they sit comfortably with the "pack" attached, they forget it entirely. Yet it's ready for instant use—if they need, or want it. And it gives them that confident feeling of "ready for anything". Likewise with the U. S. Navy and U. S. Air Mail services.

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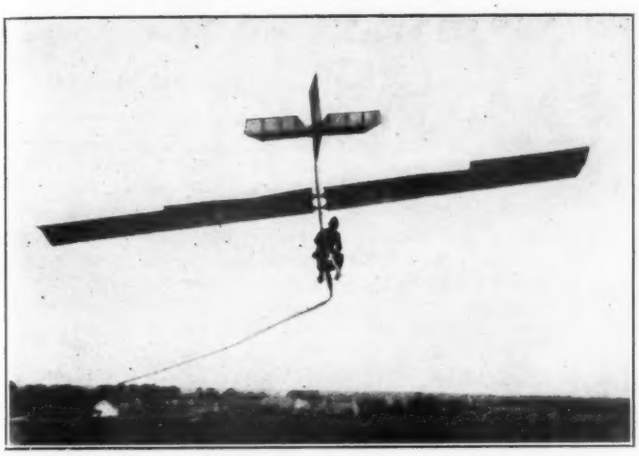
Air Mail Pilots Make Record

Earl Ward and Ed. Ballough, air mail pilots, recently made new records for the transmission of mail by airplane from New York to Chicago. Ward, who a few weeks before helped to establish the previous record, started from New York at 3:17 a. m. with mail, which should have left at 9 p. m. the previous day but was delayed by weather conditions. He landed at Cleveland at 6. a. m., having made the flight from New York in 3 hr., 3 min. The mail was tossed into the plane of Bill Williams, at Cleveland, and he landed in Chicago at 8:44 a. m., the entire trip having taken less than 5 hr., 30 min.

Ed. Ballough, during the course of a storm, took off at 8:54 a. m., from Maywood, with the Northwest mail of the New York-Chicago line. He reached St. Paul a little before 1 p. m., with a record of 9 hr., 30 min.

The schedule from New York to Chicago is given as 8 hr., 45 min., and that between New York and St. Paul, 13 hr., 30 min. The previous record between New York and Chicago was 5 hr., 36 min.

A day previous to the making of these records, George Pomeroy carried mail between Salt Lake City and Cheyenne in 2 hr., 57 min., covering a distance of 417 mi. The average flying time is 3 hr., 15 min.



International Newsreel Photo

A glider flown by college students at Fort Spandauer, Germany, in a recent competition. The release gear appears not to have left the machine when the photograph was taken.

U. S. Air Forces

TC-9 On Cross-Country Flight

The TC-9 an Army blimp, left Langley Field, Va., Sept. 1 for trip to Scott Field, Ill., and return, for the purpose of cross-country training. The personnel on the flight was as follows:

1st Lieut. Wm. A. Gray, pilot; 2d Lieut. Benjamin T. Starkey, pilot; Warrant Officer Robt. E. Lassiter, pilot; Technical Sgt. Chester H. Johnson, engineer, and Staff Sgt. Ralph E. Quinn, engineer.

The TC blimps are of 200,000 cu. ft. capacity, 196 ft. long, 57 ft. in height, 44.5 ft. maximum diameter, and the maximum capacity is nine men. They are equipped with two Wright engines of 150 hp. each. The cruising radius is about 750 miles. The TC returned from Scott Field within a few days.

War Dept. Facilitates Relief

The commanding officer at Maxwell Field, Montgomery, Ala., and the commanding officer of the Fourth Corps Area, Atlanta, Ga., were notified on Sept. 20, by telegram to hold

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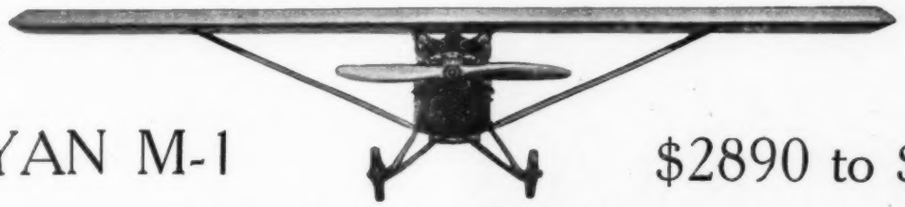

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Superior Performance with
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Acetate Nitrate **DOPES** Clear Pigmented

No. 21 Pigmented Eggshell Finish-Nitrate Spray or Brush 2 coats over clear Acetate or Nitrate. Fuselages and wings. Lustrous AUTOMOBILE-like finish. Very attractive, smooth and easy to keep clean.

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WONDERFUL OPPORTUNITY

For right party with capital to help finance one of the most promising commercial aviation developments in the country—important mail terminus—possible government station—No commercial airport in U. S. offers greater possibilities.

Communicate by letter—AVIATION, Box 499

International Newsreel
Naval Academy students taking air instruction

all facilities at the disposal of Mr. Baker, Red Cross representative, enroute by air to Florida to take charge of relief work in the districts visited by the hurricane.

Instructions were that all necessary steps be taken to furnish information regarding landing fields and to expedite the journey. Authorization for a change of planes and pilots was also given.

216,000 Miles Without Forced Landing

The Department of the Navy has announced that a record of flying 216,000 miles in less than a year, without a single forced landing was established by the Torpedo and Bombing Plane Squadron No. 1, of the Scouting Fleet Aircraft Squadrons. The squadron is composed of 12 planes.

Army Orders

First Lieut. Donald R. Goodrich, Air Corps, Detroit, to New York City, sailing Dec. 22 via government transportation for Philippine Islands.

First Lieut. Harlan T. McCormack, Air Corps, Brooks Field, to San Francisco, sailing on transport Jan. 14 for Philippine Islands.

First Lieuts, Air Corps, William J. Hanlon, Fairfield and David G. Lingle, McCook Field, to New York City, sailing Dec. 22, via government transportation, for the Philippine Islands.

First Lieut. Rudolph W. Propst, Air Corps, Chanute Field, to New York City, sailing on transport Dec. 2 for the Canal Zone.

Master Serg. Harry Secord, Air Corps, placed on retired list at Fort Riley.

Sec. Lieut. Paul Morris Lyons, Air Corps Res., Dayton, to active duty Washington, reverting to inactive status Oct. 3.

Sec. Lieut. Benjamin Harrison Rich, Air Corps Res., Dayton, to active duty Chanute Field, reverting to inactive status Sept. 26.

Sec. Lieut. Dorsey Eugene Kinney, Air Corps Res., Belle Fourche, S.D., to active duty Chanute Field, reverting to inactive status Sept. 25.

Maj. Jacob E. Fickel, Air Corps, Washington, to Wright Field.

Sec. Lieut. Vincent J. Esposito, Air Corps, Brooks Field, to Fort Sam Houston.

Sec. Lieut. James Andrew Riviere, Air Corps Res., Lake City, Fla., to active duty Brooks Field, reverting to inactive status March 9.

What Do You Know About Airplanes?

A FEW years ago men had to learn about aircraft from personal, costly experience. They had no one to guide them—no one to point out mistakes when they were made—and therefore years were spent learning what takes months now.

THOROUGH — PRACTICAL TRAINING

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Sale of the above and 5-place Hisso motored planes at remarkably low prices for quick cash turnover.

Send for descriptive circular.

THE RINEHART-WHELAN CO.
DAYTON, OHIO.

Capt. Harold Eastman Weeks, Air Corps Res., New York City, to active duty Langley Field, reverting to inactive status Oct. 19.

Capt. Henry Nelson Moore, Air Corps Res., New York City, to active duty Washington, reverting to inactive status Sept. 27.

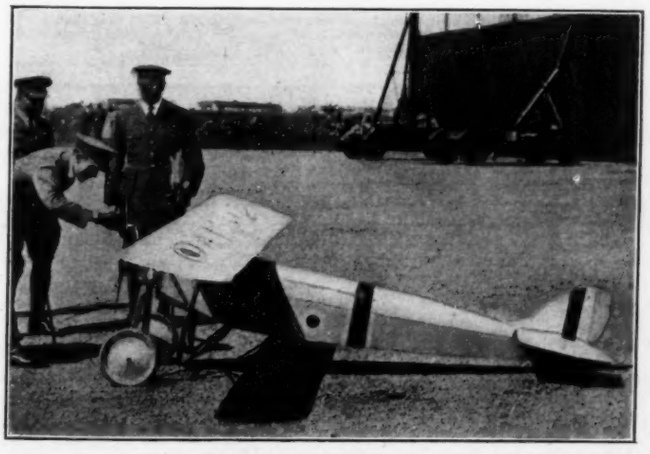
Sec. Lieuts. James William Andrew, Air Corps Res., Palmyra, Ohio, and Loren Everest Meece, Air Corps Res., Atwood, Ill., to active duty Brooks Field, reverting to active status March 10.

Maj. Gerald C. Brant, Gen. Staff, Air Corps, relieved from detail as member of Gen. Staff Corps, War Dept. Gen. Staff, and will report to Asst. Sec. of War for duty.

Capt. Harry Cornish Sigourney, Air Corps Res., Washington, to active duty Scott Field, reverting to inactive status Sept. 26.

Sec. Lieut. Edmund C. Lynch, Air Corps, Scott Field, to Brooks Field.

Following Flying Cadets appointed Second Lieutenants Air Corps: Darr Hayes Alkire, Luke Field, Dixon McCarty Allison, Mitchel Field, Chas. Arthur Bassett, Selfridge Field, Thurston H. Baxter, Jerseyville, Ill., Kenneth Watson Boyd, Brooks Field, Bernard Alexander Bridget, Langley Field, Oscar Frederick Carlson, Champaign, Ill., Jas. Henry Collins, Chanute Field, Narcisse Lionel Cote, Montgomery, Clinton Wm. Davies, Chanute Field, Wallace Stribling Dawson, Langley Field, Chas. Herman Deerwester, Selfridge Field, Harvey Flynn Dyer, Lawrence, Kan., Geo. J. Eppright, Manor, Tex., Herbert Will Gamble, Los Angeles, Lee Gehlbach, Dallas, Signa Allen Gilkey, Caldwell, Tex., John Felix Guillett, Kelly Field, Alva Lee Harvey, Brooks Field, Geo. Edley Henry, Spokane, Ralph Emerson Holmes, Oakland, Thos. Jackson Holmes, Washington, Linwood Pendleton Hudson, Brooks Field, Henry Lee Hughes, San Francisco, Clarence Shortridge Irvine, Detroit, Paul August Jaccard, Seattle, Wash., Leland Shattuck Jamieson, Kelly Field, Gerald Geoffrey Johnston, Charlotte, N. C., Frank Duane Klein, Roslindale, Miss., Reuben Kyle, Jr., Columbus, Arthur Joseph Lehman, Crawfordsville, Ind., Herbert Charles Lichtenberger, Omaha, Gregg Miller Lindsay, Louisville, Mason Harley Lucas, Portland, Geo. Leroy Murray, Bolling Field, Paul Burnham Nelson, Visalia, Cal., Chas. Winslow O'Connor, Mitchel Field, Harvey Robinson Odgen, Kelly Field, Joel G. O'Neal, Wright Field, Richard Dodge Reeve, Mitchel Field, Allan McLeod Robinson, New York City, Elmer Jos. Rogers, Jr., Langley Field, Chas. Arthur Ross, West Somerville, Mass., Josiah Ross, Mitchel Field, George Hall Sparhawk, Kelly Field, John Titcomb Sprague, Langely Field, Claire Stroh, Pueblo, Colo., John Albert Tarro, Witt, Ill., John Osman Taylor, Montgomery, Manning Jerome Tillery, Beaumont, Tex., Donald Cornelius Walbridge, Langley Field, Newell Edward Watts, Kittery, Me., Clarence Daniel Wheeler, Cleveland, Chas. Own Wiselogel, Lafayette, Ind.



The smallest airplane with a gasoline engine. A model built by student officers of the Royal Air Force at Cranwell, England. It is said to be capable of flying for 15 min.

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PUBLISHER'S NEWS LETTER

The next subject of great interest to the aeronautical public that will be discussed this year will be the important matter of aircraft regulation by the Department of Commerce. It is so important that it is difficult to emphasize the effect that it may have on the future of the whole development of the art, science and industry. While the plans that have been made are only tentative and subject to changes, the first draft that has been prepared for the consideration of the aircraft industry is so drastic in certain particulars that it can only be believed that it is presented as a suggestive study that has been based on the preliminary work of the Safety Code. While it is not time to criticize the provisions of the present draft, it should be realized by all who are interested, that if they leave the matter to those in charge without giving their advise and counsel it will be too late to make objections when the final rules are promulgated by the Department of Commerce. The situation is now different from what it has been in the past. Now, the authority exists, and it only requires the stroke of the pen to make any rules binding. It is squarely up to those in the aeronautical industry and the aircraft operators to study these regulations and to express their opinions.

* * * *

One of the unfortunate features about the tentative draft is that it was prepared by the Department of Commerce in cooperation with the Army Air Corps and the Bureau of Aeronautics. One of the things that it was hoped that the new law giving the Secretary of Commerce control over aviation would do was to divorce all aspects of commercial aviation from the Army and Navy. This was not intended as any reflection on the ability of either service but was due to the fact that their point of view was so different from that of the commercial operator that it was believed that the services should be relieved of any responsibility attached to any regularity measures that might be passed. It is comparable to the Navy being called in to prepare regulations for shipping and the Army giving advice as to the regulation of other forms of transportation in which it has an interest. One of the arguments that has been used against the unification of all air work of the government has been the fear that the military and naval arms might dominate commercial aviation. While there has been no indication that this is to be the case now, it is well to mention the possibilities at this time, so that it may be considered by the aircraft operators at the time they are discussing the new proposed rules.

There appears to be a growing dividing line separating the various groups interested in the commercial aspects of aviation in this country. First, there are the manufacturers that are supplying only the government. They, of course, have little concern over the regulation for civilian aircraft, as none of their products will come under the provisions. The second group of manufacturers are those who are building commercial aircraft. They are the companies that will be directly effected by the new regulations and it is to them that those who are anxious over the future of aviation in this country will look for leadership in getting the right kind of regulations. The third group is the air transport operators. They have a very real interest in the new law for it may have a very definite effect on the cost of the equipment that they will have to use in the future. The fourth group is composed of the aerial service operators and here is where the new rules will cause the greatest hardship, no matter how lenient they may be. The requirements for airworthiness certificates, operators licences, airmen's certificates and other necessities will have a tendency to increase the costs and make their work more difficult.

* * * *

Another effect of the regulations will probably be to throw the aviation problem into the arena of politics. The first thing anyone does, who feels that he is being injured by Washington, is to go to his Senator or Congressman and get him to present his case to the proper Department. In the case of aircraft, Secretary Hoover, who has been very responsive to the public will, as expressed by public opinion and Congressional will, may find that those who are interested in aircraft throughout the country have influential friends and are not an incoherent group of unorganized airmen. But no matter how the situation develops, the most important thing that anyone who has the best interests of aeronautics at heart can do is to follow with the closest attention the various drafts of air regulations that will be presented from time to time. AVIATION has always believed in the most simplified and lenient form of regulation while aeronautics is in the formative state. The experience in England with drastic regulatory measures has produced a most deplorable condition. This country will do well to learn from the experience of others rather than from any action that may tend to set back air development at a time when hopes are so bright.—L.D.G.

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SACRIFICE: Five-place Hisso Standard, semi-cabin, like L-S-5, D.H. landing gear, side radiators, excellent condition, built up this Spring, $1,000. Must sell. Airways, East St. Louis, Illinois.

BARGAINS: Canuck in guaranteed flying condition, less motor, $290.00. Lower wing $50.00, upper $65.00, crating extra. Jenny with good OX motor $585.00. Standard with new linen, good OX motor, $750.00, with government overhauled OX $850.00 or new OXX $1,100.00. Pinked cotton tape 2½" 3c. Write Lee R. Briggs, Memphis, Mo.

FOR SALE: Laird-Swallow, reconditioned throughout, completely overhauled, new covers, excellent motor, first check for $725. buys it. G. J. Romkey, 1230 Washington St., Burlington, Iowa.

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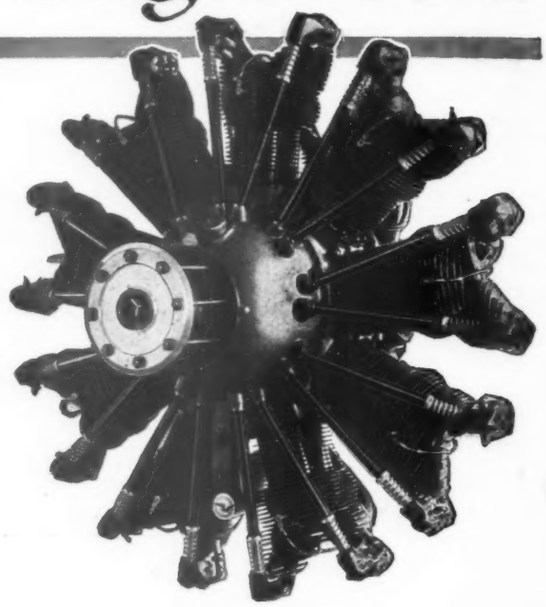

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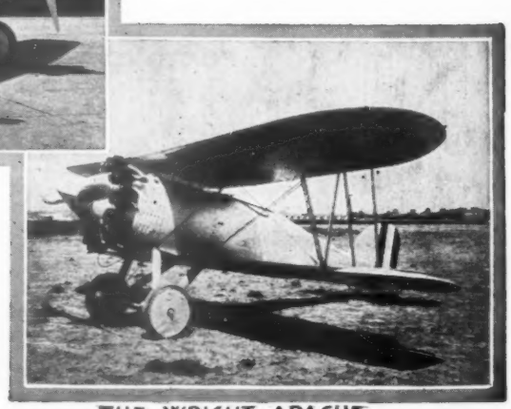

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